CO-BENEFITS OF NET ZERO RETROFIT AND STOCK INVESTMENT MANAGEMENT: SOCIAL LANDLORDS IN SCOTLAND

Funded by the Scottish Research Alliance for Energy Homes and Livelihoods
November 2025

Final Consultation Draft

CHANGEWORKS.

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Glossary of terms and abbreviations

Term	Abbreviation
Building Research Establishment Environmental Assessment Method	BREEAM
Energy Performance Certificate	EPC
Environmental, Social and Governance	ESG
Energy Efficiency Standard in Social Housing [2]	EESSH [2]
Housing Association	HA
Registered Social Landlord	RSL
Scottish Social Housing Charter	SSHC
Social Housing Net Zero Standard	SHNZS
Social Housing Quality Standard	SHQS
Social Housing Regulator	SHR
Scottish Housing Regulatory Framework	SHRF
Scottish Public Services Ombudsman	SPSO
Sustainability Reporting Standard for Social Housing	SRS

Executive Summary

Background

- This research investigated how social landlords in Scotland are incorporating the wider social and health benefits (or 'co-benefits') of energy efficient housing retrofit into asset management and investment decisions.
- The research is situated within a shifting regulatory context, as social landlords face increasing pressures to reduce carbon emissions, mitigate fuel poverty and ensure homes support tenant wellbeing.
- Retrofitting housing stock to be energy-efficient and low-carbon is central to these goals, however it remained unclear how wider non-financial outcomes influence planning and delivery.
- The study combined an evidence review, appraisal of statutory and policy obligations, and qualitative research through interviews and focus groups with housing associations and local authorities.

Findings

- The wider evidence base on this topic was found to be limited. Existing studies show that asset management and retrofit decisions remain primarily guided by financial and compliance requirements or pressures, rather than wider social or health outcomes. While many organisations express awareness of retrofit co-benefits, these are rarely translated into performance indicators or measurable investment criteria.
- Business planning processes currently integrate references to net zero within five-year and 30-year financial frameworks, but this integration is predominantly optional, and few clear methods exist for valuing non-energy benefits in financial terms. There is little evidence that cost savings from retrofit, avoided future expenditure, or improved asset values are routinely included in formal financial appraisals.

The research identifies structural and systemic reasons for this lack of inclusion:

- First, **regulation** embeds non-energy outcomes, such as health or wellbeing, in a limited fashion in the Scottish Housing Quality Standard. **Uncertainty**, particularly the pause of Energy Efficiency Standard in Social Housing 2 and delays to the Social Housing Net Zero Standard, reduces confidence to plan long-term investments. Positively, responses to new regulations on damp and mould are expected to demonstrate the sector's capacity to act when clear statutory requirements and data obligations are in place.
- Second, there is an **absence of standardised, practical methods** to assess or value co-benefits for integration into financial modelling or option appraisal. Without agreed metrics or valuation approaches, landlords cannot translate social or health outcomes into the formats required for business planning or board-level decisions.
- Third, **significant data and monitoring gaps** prevent landlords from evidencing the wider benefits of retrofit or linking them to stock investment decisions. This includes limited indoor environmental

quality data, minimal health or wellbeing indicators, and limited integration between asset systems and tenant insights.

- Fourth, **organisational capacity constraints** were consistently highlighted. Competing statutory duties, resourcing pressures and operational demands mean that activities not mandated in regulation, including co-benefit assessment, are deprioritised even where appetite exists. Decision-making authority on sustainability lies largely with senior leadership and competing priorities often lead to the de-prioritisation of climate and retrofit targets without stronger regulatory drivers in place.

- Finally, **financial planning constraints** restrict the integration of retrofit related costs and benefits. A range of sources suggests that landlords may treat future retrofit costs as a risk rather than a planned investment need, because including them in five-year projections could threaten solvency assessments or breach lender covenants. In turn, a lack of data and methodologies to quantify and integrate the benefits equally limits their inclusion. Although Environmental, Social and Governance and corporate sustainability frameworks offer avenues to embed non-financial outcomes in decision-making, they do not appear to be shaping investment strategy.

This research suggests that the **key barrier** to integrating retrofit co-benefits into decision making is not lack of awareness, but the **absence of regulatory, methodological, financial and data mechanisms** to support their incorporation. Enabling meaningful integration will require progress across four areas:

- **Clearer regulatory** and **policy expectations** linked to long-term **standards**;

- **Standardised methodologies** for assessing and valuing nonfinancial outcomes;

- **Improved monitoring** and **data infrastructure** capable of evidencing health, wellbeing and social indicators; and

- **Organisational capacity** and support to integrate these approaches into business and asset planning

Without these changes, co-benefits are likely to remain peripheral to investment decision making in the social housing sector, despite being conceptually well understood and empirically robust.

A number of areas for future research and development were identified, listed in Appendix 6.

1. Introduction and Methodology

1.1. Context

Regulatory changes in Scotland, such as the Social Housing Net Zero Standard (SHNZS), Energy Performance Certificate (EPC) reform and the inclusion of Awaab's Law-like principles into the Housing (Scotland) Act, mean that social landlords are facing new challenges in the management of their assets and investments. These obligations include increased requirements to reduce energy use and carbon emissions from heating and cooling homes, risks of tenant fuel poverty, as well as ensuring that the home environment is suitable for residents' health.

It is acknowledged that to achieve net-zero targets, Scotland's housing stock needs to be "retrofitted" to be both more energy efficient and to decarbonise the energy used for heating and other uses.[1] Retrofit entails the improvement of existing building stock in order to improve its energy efficiency. This can entail any or all of the following[2]:

- Fabric efficiency improvements (such as internal or external wall insulation)
- Ventilation (for example, mechanical extraction of air)
- On-site renewables and energy storage (e.g., solar PV, thermal batteries)
- Low carbon heat (e.g., electric storage heaters, air source heat pumps)

There is awareness in research and policy spaces of the 'co-' or 'core' benefits'[3] that retrofit can enable, including physical health benefits resulting from warmer, more energy efficient homes and improved mental health owing to lower energy bills and improved comfort.[4] [5] There is a gap, however, in understanding to what extent and how these co-benefits are being considered by asset managers within local authorities and housing associations when making investment decisions about retrofitting their housing stock.

1.2 Aims

This research sought to benchmark if social housing providers are considering the co-benefits of retrofit when making asset-level decisions in Scotland and if so, how they are being included. It has identified the barriers to including co-benefits in investment decisions and has explored pragmatic solutions to address them. This research looks across social landlords in Scotland, including local authorities, housing associations and co-operatives.

[1] Public Health Scotland. *Healthy housing for Scotland: a briefing paper setting out the fundamental link between housing and public health*. Available: https://www.publichealthscotland.scot/media/7483/healthy-housing-for-scotland.pdf
[2] Scottish Government. 2017. Climate change: evidence review of mitigation options in the Built Environment sector. (Online) Available: https://www.gov.scot/publications/evidence-review-potential-wider-impacts-climate-change-mitigation-options-built/documents/
[3] This research understands co-benefits as the non-climate benefits of retrofit that are achieved indirectly through improving the energy efficiency and performance of buildings.
[4] Scottish Government. 2017. Climate change: evidence review of mitigation options in the Built Environment sector. Available: https://www.gov.scot/publications/evidence-review-potential-wider-impacts-climate-change-mitigation-options-built/documents/
[5] Higney, A. and Gibb, K. 2024. Net zero retrofit of older tenement housing – The contribution of cost benefit analysis to wider evaluation of a demonstration project. *Energy Policy*, 191. Available: https://www.sciencedirect.com/science/article/pii/S0301421524002015

The aims of this research were as follows:

- **Aim 1 (Short-term):** Develop a better understanding of how non-climate benefits are being estimated and integrated into investment decision making
- **Aim 2 (Medium-term)**: Use insights and analysis to inform pre-investment stock analysis for housing providers by including estimates on climate and non-climate outcomes
- **Aim 3 (Long-term strategic):** Use the resulting evidence base to support further research and development to ensure retrofit measures meet compliance objectives, whilst also delivering on long term co-benefits

1.3 Methodology

The research included an evidence review, an appraisal of relevant statutory obligations, and interviews and focus groups with social housing providers in Scotland.

Evidence Review: A review of peer-reviewed articles established what is known about the non-climate benefits of retrofit, how these are measured, and to what extent they have been used to inform decisions. Following this, grey literature (including publicly available minutes from housing provider meetings and asset management plans) was reviewed to see whether, and how, co-benefits were being considered in the decision-making taking place in the social housing sector.

Statutory Obligations Appraisal: Key statutory requirements and policy drivers within the housing, health and damp and mould spaces were assessed, in order to understand the regulatory framework within which housing providers are making investment decisions.

Stakeholder Engagement: Interviews and focus groups with social housing providers and sector experts followed the desk-research. This sought to understand current investment decision-making processes, what factors are prioritised within them, and whether non-financial co-benefits feature, either explicitly or more indirectly, in asset-level decisions.

2. Evidence Review

2.1 Introduction

Existing research shows that the retrofitting of existing housing stock generates a range of co-benefits beyond reductions in household energy expenditure and carbon emissions, with important implications for individual health and the wider economy. After examining these wider, non-financial benefits of retrofit, the following review explores the research area surrounding how or if social landlords approach the non-financial benefits of retrofit when making asset-level investment decisions regarding their housing stock. This first focusses on health and wellbeing within this context, before discussing the decision-making processes themselves.

Section 2.2 presents a selection of studies evidencing the co-benefits of retrofit, drawing upon a well-established literature. However, the available evidence addressing its use within the context of social housing investment decision-making is limited. This review identified eight academic articles and three grey literature reports related to this topic, which are discussed in section 2.3.

2.2 Co-benefits from retrofit

2.2.1 Physical health outcomes

The extant literature shows that upgrading insulation and ventilation through retrofit can substantially reduce exposure to cold, damp and extreme temperatures, all of which are established drivers of respiratory and cardiovascular morbidity. Improved air quality can be achieved through mechanical ventilation and double- or triple-glazed windows, particularly in homes with high levels of indoor pollutants or adjacent to busy roads.[6] Additionally, Zhao et al (2024) used experimental and quasi-experimental studies of insulation retrofits to demonstrate outcomes ranging from warmer, drier dwellings, reductions in respiratory symptoms and indications of fewer hospital admissions for respiratory conditions, and reduced mortality among older adults with circulatory disease.[7]

Evidence on overheating in UK housing shows that many dwellings already experience indoor temperatures above recommended thresholds, with prolonged periods of heat stress that increase risks of heat exhaustion, heat stroke and exacerbations of existing diseases, highlighting the potential role for retrofit in improving summer thermal safety.[8] Furthermore, strong negative effects have been found between fuel poverty and physical health, highlighting the potential positive impact that retrofit can deliver if it can lower bills and fuel consumption.[9]

2.2.2 Mental health and wellbeing

Improvements to the internal environment are also associated with better self-rated health and lower odds of poor mental health as measured by standardised instruments.[10] Warmer, less damp homes can reduce sleep disturbance due to respiratory symptoms and discomfort, which in turn supports mood, cognitive performance

[6] Noris, F. et al. 2013. Indoor environmental quality benefits of apartment energy retrofits. *Building and Environment.* 68, pp.170-178
[7] Ibid.
[8] Zhao, Q. 2024. *UBDC data analysis reveals concern for the UK's overheating homes.* (Online) Available: https://www.ubdc.ac.uk/news/ubdc-data-analysis-reveals-concern-for-the-uks-overheating-homes
[9] Shwashreh, L. et al. 2024. Retrofit Strategies for Alleviating Fuel Poverty and Improving Subjective Well-Being in the UK's Social Housing. MDPI Buildings, 14(2), p.316
[10] Howden-Chapman, P. et al. 2007. Effect of insulating existing houses on health inequality: cluster randomized study in the community. *British Medical Journal*, 334(7591):460

and the capacity to undertake daily activities.[11] By alleviating chronic thermal stress and its associated symptoms, and by increasing occupants' control over their indoor conditions, retrofit can reduce anxiety about health and housing, particularly for vulnerable groups.[12] Meanwhile, measures to alleviate fuel poverty by improving energy efficiency may avoid its negative impact on mental health found in the literature.[13]

2.2.3 Broader economic benefits

Avoiding costs and earnings losses from illness is a clear benefit for the individual arising from retrofit.[14] Schemes through which social housing providers can access payments by reducing peak-time energy use after retrofit demonstrate impacts on overall energy networks,[15] while some analysis points to the increased property values associated with retrofitted buildings and resultant borrowing power.[16]

At the system level, healthier indoor environments can translate into lower utilisation of healthcare and fewer days lost from work and education, easing pressure on public services and improving labour productivity.[17] Economic evaluations of large-scale retrofit programmes identify substantial health-related savings per dwelling per year, arising from reduced hospitalisation, medication costs and mortality, indicating value for money from a public finance perspective. More widely, research has estimated that £14 of social benefits are gained from every £1 spent on climate change mitigation in the UK.[18] Recent work by the Edinburgh Climate Change Institute has begun to map co-benefits to the datazone level, estimating the social benefits of climate change mitigation interventions at a local scale.[19]

Research also shows that, when implemented at scale, retrofit activity supports employment in construction and supply chains[20] and enhances the quality and asset value of the housing stock.[21] Modelling from the Strathclyde University Centre for Energy Policy estimates that a 20-year programme of spending from the Scottish Government could result in 6,000 additional full-time jobs in the fourth year of the programme, which would be largely sustained in the long-term.[22]

2.3 Implementation of health and wellbeing targets

Available research suggests that while broad policy goals related to health and sustainability are occasionally considered at the strategic level, these objectives rarely influence the management of social housing assets

[11] Shwashreh, L. et al. 2024. Retrofit Strategies for Alleviating Fuel Poverty and Improving Subjective Well-Being in the UK's Social Housing. *MDPI Buildings*. 14(2), p.316
[12] Zhao, Q. 2024. *UBDC data analysis reveals concern for the UK's overheating homes.* (Online) Available: https://www.ubdc.ac.uk/news/ubdc-data-analysis-reveals-concern-for-the-uks-overheating-homes
[13] Shwashreh, L. et al. 2024. Retrofit Strategies for Alleviating Fuel Poverty and Improving Subjective Well-Being in the UK's Social Housing. MDPI Buildings, 14(2), p.316
[14] Jakub, M. and Nutter, S. 2006. Marginal costs and co-benefits of energy efficiency investments: The case of the Swiss residential sector. *Energy Policy.* 34(2) pp. 172-187.
[15] See: https://www.ukpowernetworks.co.uk/news/uk-power-networks-unlocking-energy-savings-for-social-housing-tenants
[16] Jakub, M. and Nutter, S. 2006. Marginal costs and co-benefits of energy efficiency investments: The case of the Swiss residential sector. *Energy Policy*. 34(2) pp. 172-187.
[17] Ibid.
[18] Sudmant, A., et al. 2024. Climate policy as social policy? A comprehensive assessment of the economic impact of climate action in the UK. *Journal of Environmental Studies and Sciences*, 15. pp.1-15.
[19] See: https://ukcobenefitsatlas.net/The_UK_Co_Benefits_Atlas___Poster_Summary.pdf
[20] PWC. 2022. Green skills as an enabler of UK retrofit. (Online) Available: https://www.pwc.co.uk/who-we-are/purpose/green-jobs-barometer-retrofit.pdf
[21] Jakub, M. and Nutter, S. 2006. Marginal costs and co-benefits of energy efficiency investments: The case of the Swiss residential sector. *Energy Policy*. 34(2) pp. 172-187.
[22] Turner, K. et al. 2018. Potential wider economic impacts of the Energy Efficient Scotland programme. Centre for Energy Policy, University of Strathclyde.

in England.[23] The absence of monitoring data, such as that pertaining to damp, mould or physical and mental health outcomes, further underscores the lack of systematic approaches to linking asset improvements with tenant wellbeing. For example, a case study of an English social landlord's regeneration initiatives demonstrated that early attention to sustainability, health and wellbeing often diminishes as projects progress, suggesting that these priorities are not consistently embedded throughout implementation stages.[24] This could be linked to the complexity of multi-criteria decision-making spanning multiple targets: while further exploration is needed, a 2016 study suggests that more comprehensive frameworks, developed to operationalise a wider understanding of sustainability, are reportedly unusable and unused.[25]

2.4 Decision-making processes

While energy efficiency, asset life expectancy and tenant satisfaction emerge as dominant criteria in decision-making processes amongst social housing providers, the available literature suggests that the incorporation of non-financial and social outcomes, and those related to sustainability more widely, remains inconsistent.[26] Additionally, frameworks developed to evaluate social impact are often bespoke, therefore lacking standardised metrics.[27] This limits comparability and strategic coherence across the sector.[28]

Barriers to more holistic decision-making include fragmented regulation, frequent policy changes and short funding cycles[29]; evidence suggests that short-term operational pressures, such as short funding cycles and maintenance needs, reduce attention to long-term sustainability or health objectives. Policy inconsistency can also become disruptive and undermine strategic continuity. In procurement, for example, short-term, reactive decision-making resulting from policy changes or discrepancies is said to result in missed opportunities to use sustainable materials that could result in more sustainable, healthy housing.[30]

Research also shows persistent tensions in decision-making between social and commercial considerations that influence investment. Research in England in 2020 highlighted the challenges posed by some social landlords' hybrid organisational function, due to a lack of public funding to meet social goals and an increasing reliance on cross-subsidisation from private housing market participation.[31]

Sustainability rating tools, such as the Building Research Establishment Environmental Assessment Method (BREEAM),[32] incorporate explicit health and wellbeing indicators. However, research from 2011 states that, at the project level, many professionals continue to rely on conventional cost-benefit analysis (CBA) rather than more comprehensive evaluation frameworks.[33] Brandon and Lombardi write that "construction professionals,

[23] Zhou, K. et al. 2022. Dynamics of short-term and long-term decision-making in English housing associations: A study of using systems thinking to inform policy design. *EURO Journal on Decision Processes*, 10. Available: https://www.sciencedirect.com/science/article/pii/S2193943822000061
[24] Ibid.
[25] Higham, A. P., et al. 2016. Sustainability and investment appraisal for housing regeneration projects. *International Journal of Building Pathology and Adaptation,* 34(2), pp.150-167. Available: https://www.emerald.com/insight/content/doi/10.1108/ss-09-2015-0044/full/html
[26] Higham, A. P., et al. 2016. Sustainability and investment appraisal for housing regeneration projects. *International Journal of Building Pathology and Adaptation,* 34(2), pp.150-167. Available: https://www.emerald.com/insight/content/doi/10.1108/ss-09-2015-0044/full/html
[27] Ibid.
[28] Wilkies, S. and Mullins, D. 2012. *In* A. P. Higham et al. 2016. Sustainability and investment appraisal for housing regeneration projects.
[29] Zhou, K. et al. 2022. Dynamics of short-term and long-term decision-making in English housing associations: A study of using systems thinking to inform policy design. *EURO Journal on Decision Processes*, 10. Available: https://www.sciencedirect.com/science/article/pii/S2193943822000061
[30] Ibid
[31] Jacobs, K. and Manzi, T. 2020. Neoliberalism as entrepreneurial governmentality: Contradictions and dissonance within contemporary English housing associations. *Housing Studies*, 35(4), pp. 573-588.
[32] Taylor, T. and Pineo, H. 2015. *Health and wellbeing in BREEAM*. Available: https://tools.breeam.com/filelibrary/Briefing Papers/99427-BREEAM-Health---Wellbeing-Briefing.pdf
[33] Brandon, P. S. and Lombardi, P. 2011. *Evaluating Sustainable Development in the Built Environment*. Oxford: Wiley-Blackwell.

when evaluating social housing projects' sustainability, routinely adopt monetary tools, such as CBA and [social return on investment], rather than sophisticated multi-criteria composite frameworks capable of facilitating a comprehensive evaluation."[34] According to other research, the literature suggests that such a use of CBA, where the price mechanism and market transactions are used to evaluate social and environmental costs and benefits, is limited.[35] This limitation is due to the indirect impacts associated with such factors and the fact that they may be disregarded due to having no direct market value and are consequently very difficult to price.[36]

Elsewhere, research argues that there is a need for a consistent, standardised methodology to evaluate and integrate non-financial benefits into retrofit investment strategies, such as accessible tools based on social cost-benefit analysis principles.[37] This is shown to be facilitated by ensuring social housing providers have a clear corporate strategy and the integration of ESG reporting, which can embed long-term social and environmental principles into performance measurement.[38]

Meanwhile, ESG bonds incentivise the inclusion of wellbeing and sustainability objectives in decision-making.[39] These voluntary commitments highlight how contemporary practice in asset management seeks to go beyond conforming to regulation, instead seeking to build and maintain tenant satisfaction.[40] Flexible structures and trust in lead organisations' leadership also play a role in enabling innovation and overcoming internal tensions, it is noted.[41]

An area in which health is being considered explicitly in relation to retrofit is mould risk, where recent technological innovation is aiding modelling. Assessing mould risk in retrofit projects is technically complex, requiring holistic property-level assessment rather than isolated evaluation.[42] Key variables, including relative humidity, indoor temperature and thermal bridging, must be considered collectively, yet acquiring such detailed data poses scalability challenges. There is evidence of some social landlords adopting AI-based predictive tools capable of analysing these factors with high accuracy,[43] potentially enabling earlier, proactive interventions.[44] Such approaches have the potential to enable long-term asset management decisions by targeting insulation upgrades and informing strategic retrofit investments, thus reducing reliance on periodic surveys. However, these tools are in their infancy and lack proper evaluation.

2.5 Discussion of Evidence Review

The evidence review shows that while a substantial and well-established body of research demonstrates the wide range of co-benefits associated with retrofit, these benefits are only weakly reflected in the investment

[34] Ibid.
[35] Higham, A. P., et al. 2016. Sustainability and investment appraisal for housing regeneration projects. *International Journal of Building Pathology and Adaptation,* 34(2), pp.150-167. Available: https://www.emerald.com/insight/content/doi/10.1108/ss-09-2015-0044/full/html
[36] Higham, A. P., et al. 2016. Sustainability and investment appraisal for housing regeneration projects. *International Journal of Building Pathology and Adaptation,* 34(2), pp.150-167. Available: https://www.emerald.com/insight/content/doi/10.1108/ss-09-2015-0044/full/html
[37] Higney, A. and Gibb, K. 2024. Net zero retrofit of older tenement housing – The contribution of cost benefit analysis to wider evaluation of a demonstration project. *Energy Policy*, 191. Available: https://www.sciencedirect.com/science/article/pii/S0301421524002015
[38] Zhou, K. et al. 2022. Dynamics of short-term and long-term decision-making in English housing associations: A study of using systems thinking to inform policy design. *EURO Journal on Decision Processes*, 10. Available: https://www.sciencedirect.com/science/article/pii/S2193943822000061
[39] Ibid.
[40] Fulcher, M. et al. 2022. Analysis and modelling of social housing repair and maintenance costs: A UK case study. *Journal of Building Engineering,* 52. Available: https://www.sciencedirect.com/science/article/pii/S2352710222004028
[41] Ibid
[42] Aziz, G. and Hardy, A. 2025. Environmental Profile for Damp Risk Analysis, in J. M. Bracco et al (eds.) *Moisture in Buildings: Proceedings of ICMB25.* Springer: Cham.
[43] NEC. 2025. "AI helps Wolverhampton Homes predict damp and mould with 70-97% accuracy"
[44] Housing Digital. 2025. "Damp and mould: Predict, prevent, protect with AI"

decision-making of social landlords in Scotland. The literature clearly evidences how retrofit can generate significant physical health benefits, as well as improved mental health and wellbeing outcomes, such as reduced anxiety linked to fuel bills and improved sleep. Meanwhile, there is evidence of a range of broader economic co-benefits, including avoided healthcare costs, improved productivity, increased asset value and contributions to employment and supply chains. Despite this strong evidence base on outcomes, there is comparatively little research addressing how these benefits are incorporated into social landlords' planning and investment decisions.

The evidence review indicates that although the co-benefits of retrofit are well established in the wider academic literature, they remain only partially reflected in the research on social housing investment decision-making. Research addressing how co-benefits are used within asset-level decisions is comparatively scarce, with only a small number of studies explicitly examining this issue. Where investment frameworks are discussed, they show that decision-making continues to be dominated by cost, regulatory compliance, asset condition and energy-related criteria. More comprehensive sustainability or multi-criteria frameworks exist in principle, but studies report that these are often too complex, insufficiently standardised or not operationalised in practice.

Research on decision-making frameworks identifies methodological barriers to valuing non-financial outcomes. Many studies note an ongoing reliance on conventional cost-benefit analysis, with limited use of multi-criteria evaluation tools capable of accommodating indirect or non-market impacts. Literature also reports tensions between social and commercial considerations, particularly for organisations that operate hybrid models or rely on cross-subsidy, further constraining the integration of wider societal outcomes.

A consistent theme across the literature is the lack of data required to support the integration of co-benefits into decision-making. Monitoring of damp, mould or indoor environmental conditions tends to be limited to compliance-driven requirements, and there is little evidence of systematic collection of health, wellbeing or broader social indicators. These gaps restrict the ability of asset managers to link retrofit activities with wider outcomes in a measurable way. The review identifies emerging interest in digital and AI-based approaches, particularly around modelling damp and mould or assessing overheating risk, but highlights that these tools are still at an early stage of use.

Taken together, the literature shows that while the co-benefits of retrofit are conceptually clear and empirically robust, they are not yet embedded in the frameworks used by social landlords to make investment decisions. The primary barriers identified in the evidence base are the absence of standardised methods for incorporating non-financial outcomes, insufficient monitoring and data infrastructure, methodological challenges in valuing indirect impacts and regulatory environments that do not incentivise broader outcome-based appraisal. Consequently, the systematic integration of co-benefits into decision-making remains limited within current practice.

3. RSL Regulatory Oversight: Statutory Obligations, Process

3.1 Overview

This section presents a summary of the context within which social landlords make investment decisions in Scotland and an overview of asset and stock management decision-making. Given differences in applicable regulation, it differentiates between councils and all other social landlords referred to as registered social landlords (RSLs).

First, it reviews the statutory and regulatory obligations placed on Scottish social housing providers, with a particular focus on where these obligations set requirements or are apt to increase focus on the energy and non-energy-related outcomes relevant to retrofit (such as health, social value and tenant wellbeing). Second, it identifies available evidence on whether this regulation is providing strong signals to account for in decision-making and strategies, and benefits that are likely to be increased by retrofit.

3.2 Statutory Requirements for Social Housing Providers: the Scottish Housing Regulator and Annual Assurance Statement

The Housing (Scotland) Act 2010 established the Scottish Housing Regulator (SHR) [45] as the independent body accountable to the Scottish Parliament for regulating all social landlords in Scotland, including both local authorities (councils), housing associations and co-operatives. The SHR takes a "risk-based and proportionate" approach to regulating the sector, with its main functions being "to monitor, assess, report and intervene (as appropriate) in relation to social landlords' performance of housing activities and RSLs' financial well-being and standards of governance."[46]

All social landlords are required to produce an Annual Assurance Statement (AAS) which confirms that they are meeting requirements or details the actions being taken to improve compliance. Based on this, the SHR then assesses compliance with regulatory duties and the principal risks across the priority areas of:

- Poor outcomes for tenants, people who are homeless and other service users.
- Poor quality or safety of tenants' homes.
- Poor financial performance and management (councils excluded).
- Poor governance (councils excluded).

Based on this risk assessment, the SHR will publish an engagement plan for each landlord, setting out the information, actions and further assurance required to meet legal obligations.

While it does not have the power to impose financial penalties on social landlords, the SHR has a number of significant intervention powers available under the Housing (Scotland) Act (2010) in order to address non-compliance with the above or shortcomings on the part of the landlord.

[45] Scottish Housing Regulator. 2024. Regulatory Framework. Available: https://www.housingregulator.gov.scot/for-landlords/regulatory-framework/ (accessed 24/11/2025)
[46] Ibid.

3.3 Annual Return on the Scottish Social Housing Charter and the Scottish Housing Quality Standard

To support the assurances made in the AAS, social landlords are legally required to submit to the SHR and to tenants an Annual Return on the Scottish Social Housing Charter (SSHC) or 'ARC' report.[47] This reports the landlord's performance in achieving or progressing towards delivering each of the Charter's 16 outcomes grouped into seven areas.[48] As part of this Annual Return, landlords must demonstrate whether they meet the Scottish Housing Quality Standard (SHQS).

3.3.1 Evidence of inclusion in the annual return on the Charter via the Scottish Housing Quality Standard

As part of their annual return on the Charter, social landlords must report on a number of areas directly related to energy, climate and health benefits of retrofit. As part of the Objective 4: Quality of Housing review, landlords are expected to apply the Scottish Housing Quality Standard (SHQS). The SHQS is made up of 55 elements grouped across five areas, including the following elements that could potentially be improved from energy efficient retrofitting of properties[49]:

- Annex A: Must be Compliant with the Current Tolerable Standard
  - Element 2: Rising damp and penetrating damp.[50]
  - Element 3: Lighting, ventilation and heating.
- Annex B: Must be Free from Serious Disrepair.[51]
- Annex C: Must be Energy Efficient.
  - Element 35 (amended): Homes should meet the first Energy Efficiency Standard in Social Housing (EESSH) milestone by 31 December 2020 and the second EESSH milestone by 31 December 2032.
- Annex D: Must have modern facilities and services.
- Annex E: Must be healthy, safe and secure.
  - Element 42: Mechanical ventilation and bathroom (under a limited range of circumstances).

While elements do overlap with areas that could be improved by best-practice retrofit (e.g., ventilation, fabric condition), most RSL stock in Scotland meets or eligible for exemptions across many areas of the standard. 92% of RSL stock and 83% of council stock met the standard in 2024/25.[52] Furthermore, RSLs are required to report on SHQS compliance, however detail as to why properties do not meet the standard is not included.

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[47] Scottish Government. 2022. The Scottish Social Housing Charter. (Online) Available: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2022/11/scottish-social-housing-charter-november-2022/documents/scottish-social-housing-charter/scottish-social-housing-charter/govscot%3Adocument/scottish-social-housing-charter.pdf

[48] The Customer/Landlord Relationship; Housing Quality and Maintenance; Neighbourhood and Community; Access to Housing and Support; Getting Good Value from Rents and Service Charges; Other Customers; and, Overarching Principes.

[49] Scottish Government. 2016. Scottish Housing Quality Standard: guidance for social landlords. Available: https://www.gov.scot/publications/shqs-technical-guidance-for-social-landlords/ (accessed 24/11/2025)

[50] Please note that the technical guidance has not yet been updated following the Housing (Scotland) Act 2025.

[51] While a number of structural elements relevant to retrofit benefits are covered, the focus is on serious disrepair rather than on performance that would enable benefits.

[52] SHR. 2025. Charter indicators and data by outcomes and standards. Available: https://www.housingregulator.gov.scot/landlord-performance/statistical-information/ (accessed 24/1//2025)

This implies that compliance with minimum standards may not be a substantial challenge that would create an incentive for retrofit.

In the SHQS, the area with the most stringent compliance requirements and where currently only a relatively small number of social housing providers meet minimum requirements, is Element 35 linked to the (EESSH) first and second milestones. First introduced in 2014, EESSH has set two milestones[53]:

- EESSH (2014): a target of EPC C or D to be met by 31 December 2020, dependent on dwelling type and fuel type.
- EESSH2 (2019): All social housing meets, or can be treated as meeting, EPC Band B (Energy Efficiency rating), or is as energy efficient as practically possible, by the end of December 2032 and within the limits of cost, technology and necessary consent.

These milestones and reporting on progress towards EESSH2 are, however, on hold since the 2022 recommendation by the Zero Emissions in Social Housing Taskforce to review and introduce a new standard ensure alignment of the standard for social housing with long-term net zero goals. In turn, both EESSH milestones and any reporting against them have been put on hold while a new Social Housing Net Zero Standard (SHNZS) is under development. While the public consultation on the SHNZS standard took place between November 2023 and March 2024, Scottish government announcements in late 2025 suggest that it will continue to be delayed until later in 2026. As a result, while social landlords do know that they will be required to meet minimum energy performance criteria, there is no clearly defined standard currently in place.

3.3.2 Recent and upcoming legislation affecting the Annual Return on the Charter (ARC) and SHQS

The Housing (Scotland) Act 2025 which entered into force in November 2025 includes provisions similar to those adopted in England under the Social Housing (Regulation) Act following the death of Awaab Ishak in 2020. Notably, the law makes the following changes in terms of how social landlords address damp and mould issues. Traditionally addressed as part of health and safety issues, the Act includes:

- **New ministerial powers**: Scottish Ministers have authority to set legally enforceable timeframes for social landlords to investigate reports of disrepair (including damp and mould), and to begin and complete repairs within specific periods.
- **Mandatory compliance**: social landlords have a statutory duty, rather than discretionary good practice, to promptly address hazards like damp and mould. This links to the existing treatment in the SHQS as well as explicit inclusion of damp and mould in the pre-existing Right to Repair Scheme.
- **Tolerable Housing Standard**: Initially established in 1987 and applied to all housing in Scotland, the Act has explicitly added freedom from damp and mould hazards.

In November 2025, Scottish Government published both a draft *Climate Change Plan: 2026-2040* and a draft *Buildings (Heat and Energy Performance) and Heat Networks (Scotland) Bill*. While both are in draft form with no clear indication of when they will be approved, the Plan and the Bill both suggest that the social housing sector will be subject to a revised net zero standard in the future. The Social Housing Net Zero Standard was submitted for consultation in 2023, however it is unlikely to be published as initially expected by late 2025

[53] Scottish Government. 2023. Home energy and fuel poverty. Available: https://www.gov.scot/policies/home-energy-and-fuel-poverty/energy-efficiency-in-social-housing/ (accessed 24/11/2025)

following the March 2025 meeting of the EESSH2 review group. The consultation text and the recent draft bills suggest that the main proposed requirements that could be implemented will[54]:

- Prohibit polluting heating systems in social housing properties with expected milestones in 2030, 2040 and 2045.
- Introduce a fabric efficiency rating and minimum energy efficiency standard to spur energy efficiency improvements.
- Require ventilation and air quality measures and monitoring where mechanical ventilation is not installed.

3.4 Financial performance and management requirements

Registered social landlords (RSLs) (i.e., social landlords excluding councils) must include a section in their Annual Assurance Statement on how they are meeting the seven Standards of Governance and Financial Management set by the SHR.[55] They are also required to submit financial information to the SHR, including five-year financial projections.

To support RSLs in applying these principles to business planning and asset management, the SHR has issued business planning advisory guidance. In accordance with Standard 3, the guidance focuses principally on the development, updating and publication of a business plan taking into account the prevailing economic situation, the broader context for tenants (e.g., rent affordability and wider cost of living) and the broader context for landlords (e.g., cost pressures, supply chain issues and Scottish Government policy-related investment decision).[56]

This guidance equally presents expectations on how RSLs should approach long-term strategic and financial planning. Appendix 3: Environmental Analysis identifies a range of key changes that should be taken into account, including issues directly and indirectly related to energy and non-energy benefits.[57]

These issues, among others, should be taken into account in developing the business plan that should in turn inform the RSL's financial planning modelling. The SHR defines robust financial modelling as having the following characteristics, among others:

- 30-year long-term modelling, five-year medium-term modelling, and annual detailed budgeting.
- Logical inter-relation of elements. For example, statement of comprehensive income, statement of financial position and statement of cashflows.

It is therefore assumed for the purposes of this analysis that the standard practice for RSLs and some councils is to produce annual budgeting, five-year medium-term modelling tied to their business plan and 30-year long-term modelling to inform strategic investment decisions.

[54] Scottish Government. 2023. Social Housing Net Zero Standard: consultation. Available: https://www.gov.scot/publications/consultation-new-social-housing-net-zero-standard-scotland/pages/8/ (accessed 24/11/2025)
[55] Scottish Housing Regulator. 2024. Regulatory Framework. Available: https://www.housingregulator.gov.scot/for-landlords/regulatory-framework/ (accessed 24/11/2025)
[56] Scottish Housing Regulator. 2024. Business Planning - Advisory Guidance. Available: https://www.housingregulator.gov.scot/for-landlords/advisory-guidance/recommended-practice/business-planning-advisory-guidance/#section-1 (accessed 24/11/2025)
[57] Ibid.

The SHR has also produced guidance that details an approach to asset management in line with the Regulatory Standards of Governance and Financial Management. The guidance addresses energy performance as a cross-cutting area of focus, with a dedicated section on energy performance and a fabric-first approach.

While the SHR is not able to impose financial penalties on social landlords, it has a number of intervention powers available to it under the Housing (Scotland) Act (2010) in order to address non-compliance with the above or shortcomings on the part of the landlord.

3.4.1 Evidence of inclusion in business and financial planning: five-year medium-term modelling

The SHR's Business Planning Advisory Guidance specifically states that "investment decisions in meeting net zero obligations and tackling homelessness" should be taken into account as part of the broader context for landlords to ensure that resilience is included in the business plan.[58] A broader list of areas to be considered as part of the Environmental Analysis includes the costs of decarbonisation, but also a broader set of issues such as:

- Cost pressures on landlords.
- Inflation and cost of living challenges.
- Rent affordability.
- Higher interest rates or cost of borrowing.
- Availability of public funding.
- Availability of private finance.
- Fuel poverty.

The Social Housing Regulator's *Summary of Registered Social Landlord Financial Projections 2024/25-2028/29* provides insights into how these issues are being included[59]:

- RSLs continue to forecast significant capital expenditure on improving their existing stock, a total of £1.9 billion over five years for an average of more than £5,700/unit. (£5,100/unit in 2023).
- The sector currently forecasts combined capital and revenue expenditure of £808.7 million (compared to £351 million in 2023) on EESSH compliance. This represents a significant increase from the 2023 five-year financial plans (FYFPs).
- A further £415.5 million (compared to £370 million in 2023) is forecast for investment in pre-1919 stock and from information provided on the number of pre-1919 units, this would equate to around £15,000/unit and represent an increase of £45.5 million from the 2023 FYFPs.

Moving from forecast to inclusion of these costs into business planning, only 31 (22%) RSLs have considered the cost impact of decarbonisation as part of their business planning. RSLs in turn have made some provision

[58] Scottish Housing Regulator. 2024. Business Planning - Advisory Guidance. Available: https://www.housingregulator.gov.scot/for-landlords/advisory-guidance/recommended-practice/business-planning-advisory-guidance/#section-1 (accessed 24/11/2025)
[59] Scottish Housing Regulator. 2024. Summary of Registered Social Landlord Financial Projections 2024/25 - 2028/29. (Online) Available: https://www.housingregulator.gov.scot/media/4xekvto2/summary-of-registered-social-landlord-financial-projections-2024-25-2028-29.pdf

in their expenditure forecast in total of £154.6 million. While this is an increase in the number of RSLs considering these issues, the SHR notes that:[60]

> *It is concerning that for such a significant risk area with the potential to have a material impact on the funding of business plans that the majority of RSLs are still using the fallback position of there being no policy framework in place or insufficient available information on costs.*

3.4.2 Integration into asset management and 30-year long-term asset modelling

Complementary to the business and financial planning guidance, the Scottish Housing Regulator has produced integrated asset management advisory guidance in collaboration with Arneil Johnston.[61] This guidance details an approach to asset management in line with the Regulatory Standards of Governance and Financial Management. While capturing a snapshot in time in 2022, the guidance points specifically to the Scottish Government's Heat in Buildings Strategy as a key input into strategic option appraisal of capital investment obligations. Furthermore, it states that[62]:

- Ongoing financial sensitivity analysis of changes to energy efficiency and carbon reduction standards, aligned to better insight on the cost implications, should be a priority for social landlords across Scotland.
- Landlords should carefully review asset management programmes to incorporate the costs arising from energy efficiency and net zero targets to test impacts on business plan viability.

The guidance addresses energy performance as a cross-cutting area of focus, with a dedicated section on "energy performance and a fabric-first approach." This guidance proposes a range of energy performance indicators for assets[63] and proposes that landlords should carefully consider impacts of a fabric-first approach on the cost and timing of asset improvement programmes.[64] This includes:

- The impact on business plan viability and engagement with lenders to negotiate covenants which could not cope with front loading investment.
- The extent of likely savings in energy and carbon (from both an asset and customer perspective) relative to capital expenditure and consequent payback calculations.
- How to understand property condition and enable a shift toward a comprehensive improvement approach, away from an elemental approach.
- How to better understand the tenant appetite for this approach, including engagement on rent affordability and running costs, and the level of disruption with more invasive works.
- The business impact of comprehensive improvement programmes which could involve revolving decanting and void periods, particularly for common blocks.

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[60] Scottish Housing Regulator. 2024. Summary of Registered Social Landlord Financial Projections 2024/25 - 2028/29. (Online) Available: https://www.housingregulator.gov.scot/media/4xekvto2/summary-of-registered-social-landlord-financial-projections-2024-25-2028-29.pdf
[61] Arneil Johnston is an advisory consultancy focusing on business planning for the social housing sector in Scotland.
[62] Scottish Housing Regulator. 2023. Integrated Asset Management. Available: https://www.housingregulator.gov.scot/for-landlords/advisory-guidance/recommended-practice/integrated-asset-management/#section-3 (accessed 24/11/2025)
[63] Namely: EPC rating, heating system, energy investment cost, net zero/decarbonisation cost
[64] Scottish Housing Regulator. 2023. Integrated Asset Management. Available: https://www.housingregulator.gov.scot/for-landlords/advisory-guidance/recommended-practice/integrated-asset-management/#section-3 (accessed 24/11/2025)

- Mechanisms to manage the financial impact on owners who could face significant improvement costs in mixed-tenure blocks.
- Evaluation of emerging approaches, solutions and technologies to improve building fabrics.

Little public information is currently available to assess whether this guidance has been taken up by social landlords when conducting their 30-year asset modelling as per the guidance provided.

Anecdotal discussions and work commissioned by the Scottish Government in late 2025 via the ClimateExchange suggests that limited information on the costs of retrofit required to meet the expected efficiency standard (SHNZS) are limiting integration in the modelling of asset improvement programmes. As noted in the previous section, in their report on social landlord projects in the second half of the 2020s, the SHR highlights the challenges RSLs are encountering when estimating the cost of retrofit across building archetypes and taking into account expected cost inflation rates.[65] Their analysis suggests that this is resulting in many social landlords under estimating or excluded these expected investments from their 30-year asset investment modelling altogether.

3.5 Discussion of RSL regulatory oversight

The review of the regulatory context suggests that social landlords in Scotland operate within a regulatory framework that establishes clear minimum standards for housing quality, safety and energy performance, but offers limited direct incentives or obligations to integrate wider health, wellbeing or social co-benefits of retrofit into investment decision making.

Compliance with the Scottish Social Housing Charter and the Scottish Housing Quality Standard (SHQS) remains the central focus, with most landlords already meeting SHQS requirements. While there is substantial progress to be made in meeting energy efficiency requirements, continued uncertainty surrounding EESSH2 and delays to the Social Housing Net Zero Standard further constrain long-term planning and decision making. While new duties on damp and mould will be introduced through the Housing (Scotland) Act 2025, non-energy outcomes linked to the benefits of retrofit are not consistently embedded in statutory requirements.

Financial and business planning requirements support structured medium- and long-term modelling, but the integration of retrofit-related costs and benefits within these processes remains uneven. While guidance encourages consideration of climate and net zero obligations, these expectations are advisory, and landlords often treat future retrofit expenditure as a risk rather than a defined investment need. Limited clarity on future standards and gaps in cost data contribute to under-representation of retrofit in both five-year projections and 30-year asset models.

Asset management guidance emphasises a fabric-first approach and the importance of meeting future energy standards, but there is little evidence of consistent integration into medium- and long-term financial planning and asset-level modelling. Significant uncertainties remain regarding the cost of meeting net zero requirements. These uncertainties, combined with broader financial pressures, reduce landlords' ability to systematically integrate long-term retrofit considerations into investment planning.

Overall, the review suggests that while the regulatory framework establishes essential minimum requirements, it provides few mechanisms that would enable or require the inclusion of broader co-benefits in decision-making. Compliance-driven duties dominate, and uncertainty around future standards, limited cost

[65] Scottish Housing Regulator. 2024. Summary of Registered Social Landlord Financial Projections 2024/25 - 2028/29. (Online) Available: https://www.housingregulator.gov.scot/media/4xekvto2/summary-of-registered-social-landlord-financial-projections-2024-25-2028-29.pdf

information and the absence of mandated valuation methods collectively restrict social landlords' capacity to plan for and resource large-scale retrofit aligned with wider social and health outcomes.

4. Findings from Stakeholder Engagement

Key findings

Area	Finding
Strategic priorities and organisational factors	**Decision-making driven primarily by value for money, tenant satisfaction and wellbeing, and regulatory compliance**. Sustainability has recently become a more explicit consideration in several organisations, but asset management decisions usually based on necessity.
	Where sustainability is considered, it is usually understood in terms of meeting net zero goals, rather than co-benefits. Even so, this has "gone out of the window" in recent years due to housing pressures. There is a lack of certainty amongst social landlords surrounding new and updated regulations and related obligations.
	There is a clear difficulty in resourcing anything beyond core housing focus and regulatory compliance. To include retrofit and the co-benefits of it, dedicated funding would be needed. Lack of capacity is major barrier to ability to consider wider, voluntary goals.
Short-term pressures and long-term planning	**Participants stated that if they were required to account for the wider benefits of retrofit or their potential, then they would do so**. Several stated that their organisation wanted to move in this direction, but that they were at nascent stage.
	Financial constraints are driving an insular focus on short-term upgrades to homes to meet compliance standards. Without improved public funding options, costs of decarbonisation are likely to be passed to tenants through higher rents, causing some participants to actively avoid decarbonising homes.
	There remains a lack of data on co-benefits that can be used in investment decisions, therefore landlords have difficulty including them in the decision-making process. Currently, there is a lack of formal evaluation and the skills and capabilities to be able to capture and analyse these data.
Measuring and evidencing co-benefits	**Almost all participants report that, beyond energy efficiency, non-financial outcomes are often recognised informally but not built into business plans or impact assessments**. The only exception was health-related triggers such as damp and mould where responses to mould were noted to typically be largely reactive and lack severity grading or recurrence tracking. Most participants are undertaking some form of surveying of tenants, and examples of other forms of engagement at a variety of levels were also given. The results of such surveys were said to regularly influence leadership decision-making, showing the potential for gathering data on co-benefits if a formalised process existed.
	There is an emerging use of new technology, mostly limited to home environment data collection; sensors are being piloted in a proportion of stock in response to new requirements surrounding damp and mould, while there is also interest in applying AI to model overheating and other risks.
External factors: compliance and funding	**There is a desire for strong guidance for implementing new regulations as well as emerging technologies and other developments.**
	At present, social landlords are not required to collect data on indirect benefits of retrofit or wider sustainability measures, and therefore do not. Participants were clear that if co-benefits were required in regulation or funding conditions, social landlords would integrate them into decision-making more directly. A standardised method of doing the above would be highly valued by the research participants.

4.1 Overview

Changeworks conducted focus groups and interviews to better understand if social housing providers in Scotland are considering the co-benefits of retrofit and whether they feature explicitly or implicitly in asset management decisions.

Fifteen stakeholders from the Scottish social housing sector were spoken to as part of this element of the research, across three focus groups and five interviews. This included representatives of housing associations and housing consultancies. Stakeholders held various roles in their organisations, including those related to asset management, investment management and sustainability. Data from the interviews and focus groups were collated and analysed thematically.

For a more in-depth breakdown of the methodology, please see Appendix A.

4.2 Strategic priorities and organisational factors

Across the interviews and focus groups, social landlords consistently described decision-making as driven primarily by value for money, tenant satisfaction and regulatory compliance. Sustainability has recently become a more explicit consideration in several organisations, often formalised through strategic plans and senior oversight, and sometimes supported by recruitment staff in sustainability-specific roles. However, investment decisions remain predominantly necessity based. For example, cyclical upgrades to heating systems, windows or doors, with retrofit generally treated as an additional cost rather than a core strategic pathway. Meeting regulations is a common motivator, but proactive sustainability investment is still the exception rather than the norm. Despite this, most participants stated that their organisation aimed to improve tenants' wellbeing and saw meeting regulations were a part of this rather than a 'tick-box exercise'.

Stakeholders report that where sustainability is considered, it is generally understood in terms of meeting net zero goals. Several participants note that intended plans to meet these goals have "gone out of the window" in recent years due to acute challenges social landlords are facing in meeting housing need. Consequently, more nuanced areas of sustainability related to retrofit remain out of the scope of decision-making at present. As other participants noted, accounting for retrofit and wider decarbonisation in business plans requires dedicated funding. As resources are currently going towards meeting regulatory standards, such inclusion is not usually done.

Leadership attitudes were frequently cited as a decisive factor in determining how proactive and experimental landlords were in relation to retrofit. In organisations where CEOs prioritise sustainability, proposals with environmental benefit are more likely to be approved, even without a clear financial return. Evidence from two participants also suggests that larger landlords, particularly those incorporating health-related activities within a separate section of the organisation, were more likely to incorporate wider benefits of retrofit in top-level decision-making.

In larger landlords these wider benefits could also be felt through reduced demand, whereas outcomes are more isolated for smaller social landlords. Mid-sized landlords reported having enough financial flexibility to trial measures, but capacity remains limited (e.g., installation of solar PV in up to 10% of stock annually). However, it was suggested that smaller housing providers may be able to avoid delays in actions as they have less-complex structures than larger organisations.

A challenge noted in several interviews was asset data management; multiple interviewees described lacking basic stock lists or cost models for different building archetypes. The asset management culture in the sector was described as risk-averse by one participant, who stated that it is generally slow to engage with the scale of future investment. Retrofit requirements are reportedly being treated as a risk in financial planning and therefore not properly integrated in long-term planning. The majority of organisations included in the research,

however, are in the process of updating their asset management systems to become more integrated. Rationales presented included allowing for a greater range of indicators to be assessed, as well as simplifying processes. One participant noted that the updated system will enable financial, environmental and social contribution of housing to be included in investment decisions, including whether to upgrade, repurpose or dispose of stock.

A lack of capacity was also identified as constraining the ability to consider wider, voluntary goals (i.e., those not required by regulation). Meeting compliance and safety regulations, as well as housing need, means there are simply not the resources to do more, several participants stated. However, some interviewees reported engagement with environmental and social governance (ESG) reporting frameworks, most commonly the Sustainability Reporting Standard (SRS). Group discussions with RSLs suggested that achieving strong assessments reflects reporting competence rather than a shift in organisational in organisations, however. ESG was widely characterised as a ex-post reporting duty rather than a tool shaping investment intent, although awareness of reporting obligations does influence decisions indirectly.

4.5 Short-term pressures and long-term planning

Across interviews, the pressure of short-term operational demands was a common theme. Staff at multiple levels reported that most organisational effort is spent “keeping roofs over tenants’ heads”, with only specialist improvement teams able to engage in forward-looking work.

Participants mention that, even with the desire to focus on net zero goals, tenant safety and satisfaction is the main priority for social housing providers. As shown in section three, they are subject to various requirements pertaining to health and safety through the SHQS, EESSH and through legislation such as the Housing (Scotland) Act 2010. There may therefore be an opportunity, they suggested, to show how these goals are intertwined, in order that retrofitting housing stock is thought of less as something that is “nice to do, but not a priority”, as was intimated. Interviewees stated that if they were required to account for wider benefits of retrofit (or the potential for them), then they would do so. Several stated that their organisation wanted to move in this direction, but that they were at nascent stage.

One interviewee questioned the financial viability of major retrofit programmes for ageing or hard-to-treat stock, viewing demolition and reprovision of some stock as inevitable. Questions were raised as to whether having to meet regulations on this stock represented the best use of money, as it would take far more resources and still may not achieve a high standard of energy efficiency. Most agreed that financial constraints are driving an insular focus on short-term upgrades to homes to meet compliance standards, and without improved public funding options, costs of decarbonisation are likely to be passed to tenants through higher rents. Other respondents went further, stating that even with higher rents, the costs of a ‘just transition’ will never be met without external funding.

Keeping rents low, and therefore minimising costs for tenants, was a priority for all social landlords interviewed. However, some noted that this was partly achieved by not retrofitting stock at scale, due to the limited options available for recouping costs other than through rent increases. Concerns around rent arrears due to social landlords increasing costs to tenants to meet compliance standards and new regulation were also noted by several interviewees.

Equally linked to efforts to keep costs low for tenants, the price of electricity was specifically noted as a key barrier to the roll out of low carbon technology in homes, as it is currently difficult to justify their installation when costs will be higher for tenants, and tenants can be put off. One interviewee stated that their organisation chose to keep some homes on-gas rather than install heat pumps because of the potential for higher energy bills. This is part of what several interviewees note is their organisations’ primary focus: ensuring tenants live good lives. It was recognised by several participants that the co-benefits of retrofit very much align with this

aim, but that they are not able to demonstrate this currently, and so it is not incorporated in investment decisions.

As outlined in section three, social landlords are required to produce five-year financial projections, as part of their annual return to the Regulator. Advisory guidance also recommends 30-year asset-level financial forecasts, which many social landlords opt to produce, which can be linked to asset strategies.[66] Stakeholder engagement suggested that broader social value or co-benefits are rarely factored formally into decisions, often due to the absence of quantified data which demonstrates the value of co-benefits for broader compliance objectives. Where they are considered, it is usually through informal feedback or satisfaction measures rather than formal evaluation. Interviewees reported that measures such as tenant health, fuel cost savings or wellbeing are discussed inconsistently and rarely captured in a way that affects investment governance.

Interviews indicated that in at the long-term strategic asset management level, increasing financial pressure has led to the prioritisation of assets that can recover or generate value, while expensive or complex stock (e.g., non-traditional builds, high-rises) is increasingly seen as a liability to be managed rather than improved. It was noted by several participants that asset management is in general undertaken in-house with limited external scrutiny, and cases of underestimated future costs were reported by one. Meanwhile, one participant explained that net zero goals are treated largely as a risk exposure rather than a planned, costed programme, and several interviewees stated explicitly that planning to meet the core focus of net zero targets would be financially unsustainable without central funding (e.g., EPC compliance, retrofit targets), therefore further spend on the pursuit of co-benefits would compound this pressure.

4.6 Measuring and evidencing co-benefits

Almost all participants report that, beyond energy efficiency, non-financial outcomes are often recognised informally but not built into business plans or impact assessments. The only exception was health-related triggers such as damp and mould where responses to mould were noted to typically be largely reactive and lack severity grading or recurrence tracking.

More accurate ways of capturing energy performance data are being procured by some organisations, with one participant contracting a commercial package linked to broader asset management. At present, improvements in EPC ratings are generally being used for this purpose and for evidencing wider improvements, while some participants noted that any reductions in complaints from tenants are used as an indicator of the same.

Tenant surveys are regularly carried out, although participants noted that these usually do not typically incorporate questions relating to wellbeing or health. Participants also reportedly experience difficulties in getting tenants to engage with feedback processes, surveys and with neighbourhood consultations. Regarding retrofit works, feedback is sought from tenants in relation to the quality of the work and tenants' overall experience. It was also noted that retrofit works often involved a significant level of disruption for tenants and that this could impact both the survey response rate.

Wider, community-level benefits of retrofit were also not usually considered, although two participant organisations stated that they undertook area-based engagement with residents as a standard part of engaging tenants and gathering feedback, showing the potential for the inclusion of such indicators.

[66] See, for example: https://www.lochaberhousing.org.uk/data//AM001_Asset_Management_Strategy_2025_2028_2025_03_26_14_34_22_265.pdf

Despite the above, tenant feedback surveys often drive the organisations' decisions, including those affecting the management of stock at a neighbourhood level, rent charged to tenants and value for money. One participant noted that qualitative feedback from tenants had led to changes in measures installed as a part of future retrofit. This related primarily to the reported running costs associated with air source heat pumps (ASHPs), resulting in them being installed only alongside other measures (i.e., solar PV and battery storage) in future.

Several respondents noted that their organisation often considered tenants' needs on an individual basis when they undertook retrofit works and look for ways to improve tenants' lived experience in the home. This includes the health and comfort of the tenant. It was noted that at a higher level, the use of these indicators is more difficult. Interviewees stated that if wider benefits could be quantified and clearly demonstrated, then they would be considered more often in decision-making.

Several organisations were assessing social return on investment, however, through tools such as that created by the Housing Association Charitable Trust (HACT), although the perception is that these primarily concern non-core housing activities. It was noted by some participants that the intention of using such tools is to help demonstrate 'added value', particularly in seeking grant funding. However, one participant noted that indirect benefits of retrofit would not be felt by the social landlord, but by reduced pressure on other services, such as the NHS. This means that it would be difficult to factor this into investment planning, as the social landlord would have to bear the cost.

4.7 Digital and AI Capabilities

In light of new timescales for social landlord to respond to mould, and the emerging use of technology for modelling risk noted in the evidence review, interview participants were also asked about how they used digital technology and tools as part of asset management. The use of digital tools in stock management is an emergent but uneven feature of investment planning across the social landlords interviewed. Primarily, it is limited to home environment data collection. In some cases, sensors are being introduced in response to mould, with interest in applying artificial intelligence (AI) to model overheating and other risks, while one instance of drones being used to survey solar panels was also recorded. However, budget constraints, established processes and organisational resistance were consistently cited as barriers to pursuing newer technologies. Although AI policies exist in some organisations, skills and application are currently limited.

Some participating social landlords are piloting sensor deployment to identify at-risk archetypes as a basis for future, more proactive measures. One social landlord reported using sensors in a number of their properties to collect data to plan improvements, for example when internal temperatures have been low and humidity high, rather than just respond reactively when problems arise. Others are reportedly using sensors when risks to a property or tenant are identified, such as reports of damp and/or mould. While some participants noted that tenants did not like the idea of sensor deployment or thought of it as 'surveillance', others reported it being well received, potentially highlighting the importance of engaging tenants to assuage concerns. Some participants also stated that there were concerns amongst social landlord staff around how the data were used, however, particularly around GDPR.

There is some evidence of sensor data being used in decision-making, including how measures such as mechanical ventilation and heat recovery (MVHR) improve the lived experience of tenants' homes. Elsewhere, participants made clear that such use of data is desired, for example in being able to use insights from large-scale data to plan stock improvement. At present, however, participants indicated that sensor data are predominantly not being linked to wider outcomes and thus not being used in investment decision making in this way.

Several interviewees noted that even where new technologies or practices are piloted, including 'deep' retrofit, costs prevent wider rollout. The high cost of such sensors was noted as a barrier to their wider use; several participants believed that funding was needed in order to install these more widely and utilise data effectively. More widely, skills development is a priority for organisations; while some had staff for whom data improvement was in their remit, other participants noted a low level of digital maturity in their organisation or a disparity in the use of digital tools between teams.

AI is also beginning to be used in a structured way by some participants, or a way of doing so is being identified. In particular, ways of using AI to analyse data from environmental monitors/home sensors to assist with maintenance planning are being sought by social landlords. Additionally, participants expressed optimism in the use of AI in switching energy tariffs on behalf of tenants, and for giving tenants insights regarding how to cut the costs of the energy bills. Some concern was noted regarding reliability issues with AI, meaning that quality assurance is needed. However, several participants explained that greater use of digital tools and AI within their organisations' work would necessitate staff having the capacity to do so, which wasn't currently realistic.

4.8 External Factors: compliance and funding

Across all interviews, there was agreement that regulatory requirements strongly shape practice. However, It was felt by several interviewees that clarity is needed from Scottish Government on regulatory requirements and timelines. There is a desire for strong guidance for implementing new regulations as well as emerging technologies and other developments; participants explained that they do not have the resources to trial different measures or installations, although they would like to.

Participants were clear that if co-benefits were required in regulation or funding conditions, social landlords would integrate them into decision-making more directly. Several interviewees expressed the view that if there was support for social landlords in how to use data relating to co-benefits, or a standard practice of doing so, this would be highly beneficial. At present, external stakeholders (such as funders, the Scottish Government and the Regulator) are not asking for these data, it was explained, and neither funders nor government provide resource for impact evaluation. This reportedly suppresses any organisational incentive to collect or use such evidence. In general, participants noted a disconnect between policy goals and the funding available.

As well as a lack of funding in this area, funding cycles themselves were reportedly a major barrier for investment planning. Funding for retrofit measures is often annual and requires delivery that financial year, it was explained, but having contractors in place for such delivery is extremely difficult within these timelines. This directly impacts organisations' ability to plan in the long-term. For example, one participant explained that the length of time the interviewee waited to hear the result of a funding application meant that the installation of measures was delayed and heating systems had to be changed during winter, which caused problems for tenants and the social landlord.

5. Discussion and Conclusions

This study examined whether, and how, social landlords in Scotland are incorporating the wider benefits of retrofit into asset management decisions, and what conditions would be required for those benefits to shape practice. The combined findings from the evidence review, statutory obligations analysis and stakeholder engagement suggest a consistent pattern: although the co-benefits of retrofit are well established in academic literature and recognised conceptually by social landlords and in part by regulation, these wider outcomes are not systematically incorporated into asset-level investment decision-making in Scotland. Across all three strands of analysis, decisions remain driven primarily by near-term costs, regulatory compliance and core housing management pressures. There are limited mechanisms (regulatory, financial, data or organisational) enabling climate or wider health, wellbeing or social benefits to shape strategic planning.

The review of the literature demonstrates a substantial evidence base on the physical, mental and economic benefits of retrofit, including improvements to indoor environmental quality, reductions in cold and damp, mitigation of overheating risks, enhanced mental wellbeing, avoided healthcare use and contributions to productivity and local economies. However, research on how these co-benefits are used within social housing investment decisions is comparatively limited. Insights from stakeholder engagement supported the findings in the literature that decision-making frameworks typically prioritise short-term operational imperatives and conventional cost–benefit criteria, with multi-criteria or more holistic evaluation approaches remaining largely unused. Persistent data gaps, particularly regarding indoor environmental conditions, tenant health and wider social outcomes, further restrict the ability to quantify or operationalise these benefits.

The review of the regulatory context shows an environment that reinforces a compliance-oriented approach led by minimum standards, with few explicit levers that would reward investment in retrofit. While the Scottish Social Housing Charter, the SHQS and EESSH2/SHNZS set important minimum standards across quality, safety and energy performance, they provide only limited incentives to landlords to consider co-benefits or wider social outcomes. On one hand, compliance rates with SHQS are already high, and health-related obligations focus predominantly on damp and mould reinforced by the introduction of new statutory duties through the Housing (Scotland) Act 2025. On the other, substantial policy uncertainty (most notably the pause on EESSH2 and delayed introduction of the Social Housing Net Zero Standard) limits the ability of landlords to develop long-term investment strategies. As a result, there appears to be a lack of incentive for retrofit at scale.

The stakeholder engagement provided direct organisational insight into how these structural and evidential limitations manifest in practice. Participants consistently described decision-making as driven by value for money, tenant safety and meeting statutory requirements. Sustainability considerations are increasingly present at a strategic level, but wider co-benefits are typically recognised only informally. Based on the information provided by participants, formal integration into business cases, asset appraisals or financial planning remains rare. Resource constraints, staff capacity and competing operational demands all appear to contribute to a short-term focus that limits attention to broader benefits. Positively, leadership attitudes and organisational size were noted as influencing the extent to which issues have been taken up, with larger or better-resourced landlords more likely to trial new approaches. Across the board, however, data limitations identified in the literature are similarly reflected in stakeholder accounts, with challenges linked to asset information system and data collection. Digital and AI-based tools are being piloted, particularly for damp and mould or overheating risks, but cost, skills and uncertainty restrict wider adoption.

Furthermore, although regulatory guidance encourages integration of net zero considerations into business planning and asset modelling, this guidance remains advisory and partially implemented in practice. As seen in the literature, there is limited evidence that health, wellbeing or social outcomes are translated into

measurable indicators used in appraisals or investment business cases. Participants indicated that many landlords therefore treat retrofit-related costs as a risk to be managed rather than a planned investment need, particularly in the absence of robust cost data for different building archetypes. While current guidance on business planning does include direct references to the costs of net zero when looking at capital and investment planning, full integration into five-year business planning and 30-year financial planning remains partial. At present, there is little evidence in SHR reports in this area that these costs are being consistently included.

Beyond financial planning and asset management, ESG and sustainability commitments do create a discursive space for broader conceptualisations of value, but in practice may function mainly as reporting, rather than decision-shaping systems. Interviewees consistently indicated that decisions relating to sustainability are ultimately made at CEO, board or executive level. As noted by the research participants, there has been a focus on climate goals by senior leaders in the sector in recent years, however this has often been subsequently deprioritised in light of other pressures.

While further evidence is needed, this appears to be linked to two principal factors. Firstly, there is no clear guidance or approach to 'costing' the benefits of retrofit outcomes relating to climate and energy, fuel poverty or health, in financial terms. Specifically, there appears to be limited guidance on how to estimate the financial or operational benefits of retrofit and include them in financial calculations, such as cost savings from retrofit, avoided future capital expenditure, or increased asset valuation linked to compliance. Secondly, participants suggested that the costs of retrofit may be undervalued in in financial planning due to the risk it would have on evidencing solvability. To support this integration, it may be necessary to ensure that in addition to the costs, the indirect financial benefits of retrofit can be evidenced and incorporated in financial planning. For example, the literature notes the increased stock values associated with retrofit could be used for such a purpose.

There are, however, new regulations pertaining to damp and mould, requiring social landlords to adhere to stricter timescales and a statutory duty to address hazards. The findings from the research show that social landlords are enhancing the ways by which they investigate and respond to instances of damp and mould. Findings also suggest that most are responding to the introduction of this new regulation in a way that utilises improved data collection and management tools and systems. These new regulatory obligations could improve incentives to address health outcomes with knock-on effects for outcomes given the similarity of some retrofit measures. As participants suggested, if social landlords were required to collect and utilise data on co-benefits of retrofit then they would, and this would evidence these benefits in more tangible ways, allowing for their wider inclusion in decision-making. This could build on the existing trends of social landlords conducting a range of engagement methods, as well as beginning to collect home environment data through which co-benefits of retrofit could be evidenced. As one stakeholder noted, a toolkit or standardised approach to doing this would be beneficial both for deliverability on the part of landlords, but also consistency and reliability of data on a wider scale.

Taken together, this analysis suggests that the key barrier to integrating co-benefits into investment decision-making is not a lack of awareness of these outcomes, but rather the absence of a clear regulatory requirement and systematic mechanisms that support their incorporation. Organisationally, landlords face financial pressures, capacity constraints and operational demands that limit their ability to act on non-statutory objectives. Policy uncertainty compounds this, making long-term planning risky and reducing confidence to invest.

Overall, the research indicates that enabling social landlords in Scotland to incorporate co-benefits into decision-making will require progress across four areas:

1. **Clearer regulatory and policy expectations** linked to long-term standards;

2. **Standardised methodologies** for assessing and valuing non-financial outcomes;

3. **Improved monitoring and data infrastructure** capable of evidencing health, wellbeing and social indicators; and

4. **Organisational capacity and support** to integrate these approaches into business and asset planning.

Although conceptually recognised and empirically robust, there is a risk that co-benefits will remain peripheral to investment-level decision-making within the social housing sector without these supporting mechanisms.

6. Areas for Further Research and Development

1) Standardised valuation and metrics for co-benefits

Scope: Drawing on existing work by HACT, the National Retrofit Hub, the Edinburgh Climate Change Institute, among others, engage with social housing stakeholders to explore next steps in developing a practical, ready methodology that translates health, wellbeing and wider social outcomes into inputs for option appraisal and business cases.

Candidate funders/partners: Scottish Government (Heat in Buildings), SRA-EHL Members, UKRI (ESRC/EPSRC), SFHA; collaboration with health economists and RSL finance leads.

2) Bringing retrofit cost and benefits into RSL financial and asset planning

Scope: Benchmark and review financial and asset planning practice to identify an approach to integrate the costs and benefits of retrofit into core financial plans, to support integrated assessment and improved board decision-making. This will involve exploration of methods by which to improve estimations of these costs and benefits of retrofit in a way that facilitates integration into financial and asset planning.

Candidate funders/partners: SRA-EHL, Scottish Government, SFHA, Arneil Johnston

3) Embedding co-benefits in ARC/SHQS reporting

Scope: Define the simplest changes to ARC/SHQS indicators and SHNZS expectations and that would support the use of co-benefits evidence (e.g., indoor environmental quality (IEQ), damp/mould severity, overheating).

Candidate funders/partners: Scottish Government, Social Housing Regulator, SRA-EHL members; SFHA

4) RSL Data Collection and Benefits

Scope: As RSLs increasingly collect increased data on their stock, explore how this can be managed and leveraged to provide improved data on the benefits of stock intervention for financial and asset planning decisions. This could cover qualitative tenant surveys, common data models, integration with asset management systems, IEQ sensors and tenant feedback, for example. If feasible, real-world trials of sensors and AI models that predict damp/mould or overheating risk, testing accuracy, bias, cost-effectiveness and procurement pathways from pilot to become part of business as usual.

Candidate funders/partners: SRA-EHL, Innovate UK; vendors of AMS/sensor platforms.

5) Stock retrofit prioritisation under fiscal constraint

Scope: RSL financial planning and asset modelling aims to support decisions on stock management which can range from no action to deep retrofit or disposal (either demolition, sale or transfer). The sector does not currently appear to have a clear set of decision rules and a methodology for sequencing interventions. This is particularly the case for assets that could be classified as hard-to-treat (e.g., non-traditional, high-rise) with the aim of balancing net zero, affordability and social service provision outcomes.

Candidate funders/partners. SFHA, SRA-EHL members, Scottish Government (Place-based Investment), local authorities.

7. Acknowledgements

This research was funded by the Scottish Research Alliance for Energy Homes and Livelihoods.

We would like to thank the following organisations for their participation in the research and/or contribution to it:

Arneil Johston; Barrhead Housing Association; Berwickshire Housing Association; Eildon Housing Association; Grampian Housing Association; Hillcrest Housing Association; Maryhill Housing Association; Muirhouse Housing Association; Paisley Housing Association; Queens Cross Housing Association; Scottish Borders Housing Association

8. Appendices

Appendix A

Focus Group Methodology

The project team conducted a mixture of interviews and focus groups with eight organisations, including Scottish housing associations, local authorities and a housing consultancy. The sessions were between 1 hour and 1.5 hours and were conducted virtually via Teams. The team used a structured topic guide for all the interviews and focus groups to ensure consistency across the sessions. The topic guide can be viewed in Appendix B.

Appendix B

Interview/ Focus Group Topic Guide

A. Strategic / Organisational Priorities (15 mins)

1. What are the main outcomes your organisation seeks to achieve in housing stock management?
    a. PROMPT: Are these primarily financial (cost/maintenance), regulatory compliance, or broader outcomes (tenant wellbeing, sustainability, community impact)?

2. Do you incorporate long-term social, environmental, or health outcomes into asset management and stock management decisions?
    a. PROMPT: If yes, what drives this?
        i. Regulatory requirements?
        ii. ESG reporting or sustainability benchmarking (e.g., SRS)?
        iii. Organisational strategy or tenant/community needs?

3. Do tensions arise between short-term operational/financial demands and longer-term social or environmental goals? How are these navigated?
    a. PROMPT:
        i. What internal mechanisms (e.g., leadership commitment, knowledge sharing) help resolve or exacerbate tensions?
        ii. What additional resources or data would help manage these better?

B. Metrics and Indicators (15 mins)

4. How are non-financial issues (health, wellbeing, community sustainability) currently assessed in management or investment planning?
    a. PROMPT:
        i. Are retrofit risks (e.g., mould from IWI, ventilation trade-offs) modelled at design stage, or only post-hoc?

ii. Are there standardised approaches, or is it still ad hoc/project-specific?

5. Do you take an issue-by-issue approach (e.g., mould, overheating) or look at connections between different benefits/outcomes?

6. What types of metrics/indicators (qualitative or quantitative) do you use to assess health, wellbeing, and tenant/community priorities?
    a. PROMPT:
        i. When/how are these indicators integrated into formal decision-making (e.g., option appraisals, asset planning tools)?
        ii. Have they led to tangible changes in investment decisions?

C. Digital/data/AI tools (optional if time permits 10 mins)

7. What role do digital tools, data systems, or AI models play in helping you manage long-term risks (e.g., mould, damp, overheating)?
    a. PROMPT:
        i. What indicators are used in predictive models (humidity, thermal bridging, temperature)?
        ii. What are the main barriers (cost, skills, data quality, system compatibility)?
        iii. Are you aware of anyone who is currently using this for stock management?

D. Organisational Factors (10 mins)

8. How do organisational characteristics (e.g., size, leadership, digital maturity, structure) shape your ability to prioritise non-financial outcomes, especially when ROI isn't obvious?

9. How do external factors (e.g., local authorities, funders, regulators) support or constrain efforts to prioritise co-benefits (health, wellbeing, sustainability)?
    a. PROMPT:
        i. How does policy stability/instability affect long-term planning and confidence to deliver?

10. How does your organisation learn from past projects or pilots to improve delivery of social, environmental, and health outcomes?
    a. PROMPT:
        i. Feedback loops, monitoring, modelling?
        ii. What helps sustain attention to these issues long-term (e.g., internal champions, reporting requirements, culture)?

E. AOB (5 mins)

- Are there any examples, case studies, or reflections you'd like to share that illustrate how your organisation is approaching these challenges?
- Anything we haven't covered that you think is important?
- Thank participant and explain next steps.

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