



UK Government

RAF063/2223: Social Housing Decarbonisation Fund (SHDF) Wave 1

Impact evaluation – thematic case study

Energy efficiency upgrades carried out in social homes outside of the SHDF Wave 1

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1. Introduction

The aim of this case study is to consider the social housing retrofit activity carried out by Local Authorities (LAs) that did not take part in Wave 1 of the Social Housing Decarbonisation Fund (SHDF).

The purpose of this was to support understanding of whether and how LAs carried out energy efficiency upgrades in social housing in the absence of SHDF funding.¹

The case study draws on the following data sources (further details are given at the end of the case study):

- Secondary data, including official government statistics on energy efficiency schemes.
- Online desk research for a sample of 12 LAs that did not participate in SHDF Wave 1.²
- In-depth interviews with two unsuccessful SHDF Wave 1 applicants and three non-applicants (i.e. LAs who engaged with the Social Housing Retrofit Accelerator (SHRA) for support with their application but ended up not applying to Wave 1).

This case study:

- Examines motivations and barriers to social housing retrofit amongst LAs not participating in SHDF Wave 1.
- Explores the use of funding outside SHDF Wave 1 to retrofit social housing. This includes funding from other government schemes and internal funding.
- Investigates changes in the Energy Performance Certificate (EPC) Bands of the social housing stock of LAs not taking part in SHDF Wave 1, over the period of the scheme.

2. Motivations and barriers to installing energy efficiency measures in social homes

Motivations to undertake social housing retrofit amongst the sample of 12 non-participating LAs were explored through a review of online documentation published by these LAs (e.g. Home Energy Conservation Act reports, materials from their websites).

This review suggested that key motivations to undertake retrofit in social housing included understanding the threat of climate change and climate emergencies, and achieving targets for carbon neutrality. Two of these LAs also reported wanting to improve the energy efficiency of social homes to alleviate fuel poverty. Two unsuccessful Wave 1 applicants that were interviewed reported that being able to improve the living conditions of their residents, particularly those with low income, was a key motivation to do retrofit works.

¹ Delivery of Wave 1 began in March 2022 and was completed in July 2024.

² The process for selecting the sample is described at the end of the case study. Broadly, they were picked at random while ensuring representation across: the different English regions, those who did and did not own their own social housing stock, and participation in SHDF Wave 2.1.

Overall, motivations to undertake social housing retrofit among non-participating LAs were very similar to those reported by social housing landlords (SHLs) participating in SHDF Wave 1, as reported in the SHDF Wave 1 process evaluation report.³

Desk research on the 12 non-participating LAs and interviews with two unsuccessful applicants identified some barriers to retrofitting social housing. These included:

- **Resident refusals:** Two LAs reported residents refusing retrofit works due to uncertainty about new technologies, the need to leave their properties during works and concerns about rising bills.
- **Measure-specific challenges:** Some LAs reportedly hesitated to invest in low carbon heating measures such as Air Source Heat Pumps (ASHPs) due to a perceived risk that they could increase residents' energy bills. One LA who owned their social housing stock had concerns that ASHPs required well-insulated homes and user competency, making them less viable for certain households. Another LA who owned their housing stock expressed concerns that External Wall Insulation (EWI) and ASHP installations could be constrained by local planning permissions, increasing the length and cost of works.
- **Challenges related to specific property types and locations:** These were reported by four non-participating LAs and one unsuccessful Wave 1 applicant. Challenges included working with solid wall homes that were hard-to-treat, the nature of the construction of energy-inefficient park homes, and listed or heritage buildings. Conservation areas, rural districts with aging populations, and constrained grid networks also made energy efficiency works complicated to do.
- **Challenges with supply chain capacity, across both installers and surveyors:** This was reported by one LA that did not own social housing stock.
- **Lack of funding:** Desk research about one LA that did not own social housing stock highlighted budgets were insufficient to install energy efficiency measures in a large number of properties and/or to carry out whole house retrofit.

These challenges were generally in line with those experienced by SHLs participating in Wave 1.3 Other challenges reported by Wave 1 SHLs included cost inflation of materials and labour and poor weather. These may have also affected non-participating landlords but did not emerge from the research.

Another challenge faced by Wave 1 SHLs related to meeting PAS 2035 standards, resulting in delays in delivery. This may have not applied to non-participating landlords if their retrofit activity was not undertaken as part of a government scheme with this requirement.

³ DESNZ (2024) '[Social Housing Decarbonisation Fund Wave 1: process evaluation report](#)'

3. Social housing retrofit funded through other government schemes

Other government schemes that supported social housing retrofit were available at the same time as SHDF Wave 1. Table 1 lists key features of these schemes (ECO3, ECO4, HUG1, LAD3 and GBIS). Evidence from the desk research on 12 non-participating LAs shows that retrofit works funded through HUG1, LAD3 and ECO3 were carried out in at least eight of these areas.⁴ However, it was unclear whether the funding was used specifically to retrofit social housing.

⁴ At the time of analysis, Wave 1 delivery was expected to complete before the start of GBIS. Therefore, the involvement of these LAs in GBIS was not explored.

Table 1: Overview of other government energy efficiency schemes available for social housing retrofit at the same time as SHDF Wave 1

Scheme name	Overview of the scheme	Geographic coverage	Household eligibility requirements	Scheme co-funding requirement	Delivery timeline
Energy Company Obligation 3 (ECO3)	This scheme placed an obligation on energy companies to deliver energy efficiency measures to domestic premises.	England, Scotland, Wales	Low income and fuel poor households living in properties with EPC D-G across Great Britain.	No co-funding requirement.	December 2018 – March 2022
Energy Company Obligation 4 (ECO4)	This scheme placed an obligation on energy companies to deliver energy efficiency measures to domestic premises.	England, Scotland, Wales	Low income and fuel poor households living in properties with EPC D-G across Great Britain.	No co-funding requirement.	April 2022 – March 2026
Home Upgrade Grant Phase 1 (HUG1)	This scheme for LAs aimed to improve energy efficiency and provide clean heat solutions for low-income households. The scheme targeted off-gas grid properties.	England	Low income households living in properties with EPC D-G. The main focus was on upgrading privately owned housing.	Up to 10% infill of social housing. Landlords to contribute at least 50% of grant value or one third of total costs.	April 2022 – October 2023
Local Authority Delivery Scheme 3 (LAD3)	This scheme was offered to LAs to raise the energy efficiency of low income and low energy performance homes.	England	Low income households living in properties with EPC E-G, with some limited upgrade to properties with EPC D.	Up to 10% infill of social housing. Landlords to contribute at least 50% of grant value or one third of total costs.	January 2022 – December 2023
Great British Insulation Scheme (GBIS)	This scheme was designed to help install insulation measures in the least energy efficient homes in Great Britain to tackle fuel poverty and help reduce energy bills. It placed an obligation on medium and large energy companies to deliver these measures.	England, Scotland, Wales	Households living in properties with EPC D-G and with Council Tax bands A-D in England or A-E in Scotland or Wales.	Beneficiaries may have to pay a contribution towards installations.	April 2023 – March 2026

Table 2 shows the total number of social homes retrofitted as part of ECO3k, ECO4, HUG,1, LAD3, and GBIS at the same time as SHDF Wave 1. A total of 16,056 properties received measures as part of SHDF Wave 1.⁵ A small number of social homes were retrofitted as part of HUG1 (240), LAD3 (1,231) and GBIS (2,124). However, it was optional for LAs to report tenure type for HUG1 and LAD3, so these figures may be underestimates.

A much larger number of social homes (22,378) received energy efficiency measures as part of ECO3 and ECO4 during the period of SHDF Wave 1 delivery (i.e. between March 2022 and July 2024), suggesting ECO contributed to the improvement of energy efficiency in social housing. However, ECO was delivered across Great Britain, whereas SHDF Wave 1 was exclusive to England.

Table 2: Total number of social housing properties retrofitted via other government energy efficiency schemes available at the same time as SHDF Wave 1

Scheme	Data source	Social housing properties retrofitted
ECO (3 & 4)	DESNZ (2025) ' Household Energy Efficiency Statistics, headline release January 2025 '	ECO3: 3,307 (March 2022) ECO4: 19,071 (March 2022 – July 2024)
HUG1	DESNZ internal statistics. Because it was optional for LAs to report tenure type of properties, this figure may be an underestimate. The accuracy of the data has not been verified by DESNZ.	240 (for the full period of the scheme, April 2022 – October 2023)
LAD3	DESNZ internal statistics. Because it was optional for LAs to report tenure type of properties, this figure may be an underestimate. The accuracy of the data has not been verified by DESNZ.	1,231 (March 2022 – December 2023)
GBIS	DESNZ internal statistics.	2,124 (April 2023 – July 2024)

4. Social housing retrofit funded through internal funding

LAs may also deliver retrofit to their social housing stock using internal funding. Desk research on the 12 non-participating LAs did not identify any clear evidence that internal funding was used to undertake energy efficiency improvements in social housing properties.

However, in interviews, one of the two unsuccessful applicants mentioned undertaking similar scale retrofit to that planned for SHDF Wave 1 using internal funding. They reported that using internal funding was more straightforward because there was less administration involved, and they did not need to undertake a whole house assessment before installing measures. The other unsuccessful applicant had applied for SHDF Wave 2.1 to carry out retrofit of their social housing stock, and their bid was successful.

⁵ DESNZ (2025) '[Social Housing Decarbonisation Fund statistics: April 2025](#)'

Two of the three interviewed non-applicants reported using internal funding to undertake social housing retrofit. One non-applicant said that they undertake retrofit to improve the energy efficiency of their housing stock annually using their internal budget. This is because they find applying for external funding difficult and time consuming.

Another non-applicant reported that they have sufficient internal capital funding to deliver the type and amount of retrofit they want and therefore did not apply for Wave 1 funding. They have installed a number of ASHPs and Solar PV and are trialling technologies such as thermal batteries, floor insulation with Q-Bot,⁶ insulating paint and smart management of home energy systems.

5. Change in the EPC Bands of the social housing stock of non-participating landlords

To further understand the impact of social housing retrofit outside SHDF Wave 1, we looked at improvements in EPC Bands to C or above of the social housing stock within our sample of non-participating LAs during the period of SHDF Wave 1 delivery (EPC Band C was the target for Wave 1).

Table 2 shows the percentage of social homes with EPC Band C or above every year between March 2022 and March 2024 for the 12 non-participating LAs included in the desk research.

All of the 12 non-participating LAs had a higher proportion of social homes at EPC Band C or above in 2024 compared to 2022. East Riding of Yorkshire showed the largest difference (25.8%), whereas the smallest difference was observed in Aran (0.3%). The average difference in proportion of social homes at EPC Band C or above between 2022 and 2024 across the 12 LAs was 9.4%.

This data suggests that the energy efficiency of the social housing stock of these LAs improved over a similar time period to that of Wave 1. While this may have been a result of retrofit works carried out in these properties, this interpretation should be caveated given that:

- Social housing stock within LAs may have changed through other means such as through the sale and purchase of properties.
- Stock improvements may have been undertaken at an earlier time, but EPC ratings may have only been updated in this timeframe.

⁶ Q-Bot is a UK-based company that utilises robotics and artificial intelligence to install underfloor insulation in existing buildings.

Table 2. Percentage of social rented dwellings at EPC Band C or above for the sample of 12 non-participating LAs from March 2022 to March 2024

LA	% of social homes at EPC Band C or above (2022)	% of social homes at EPC Band C or above (2023)	% of social homes at EPC Band C or above (2024)
Bury	58.8%	60.0%	62.3%
Arun	64.7%	65.0%	64.9%
Mansfield	59.1%	56.4%	59.4%
Wiltshire	51.0%	53.5%	55.2%
Malvern Hills	57.2%	61.5%	63.5%
Barnet	48.9%	49.8%	51.5%
East Riding of Yorkshire	54.9%	59.7%	69.0%
Middlesbrough	61.1%	62.5%	65.1%
Lichfield	55.7%	60.0%	62.8%
South Norfolk	51.4%	54.0%	56.7%
Gedling	58.8%	60.7%	64.1%
Tower Hamlets	58.4%	61.7%	68.5%

Source: Office for National Statistics Energy Statistics for Rural England dataset using EPC register data. Base numbers for social housing stock are not available in this dataset.

Table 4 shows the average proportion of social housing properties at EPC Band C or above across LAs that took part in SHDF Wave 1 and non-participating LAs. A small proportion of social homes in England was retrofitted as part of SHDF Wave 1 (0.4%).⁷ The table shows very little difference between the two groups.

Table 4: Percentage of social rented dwellings at EPC Band C or above for LAs who did and did not take part in SHDF Wave 1

Year	LAs that took part in SHDF Wave 1 *	LAs that did not participate in Wave 1 **
March 2021 – March 2022	58.3%	58.5%
March 2022 – March 2023	60.2%	60.9%
March 2023 – March 2024	63.2%	63.4%

Source: Office for National Statistics Energy Statistics for Rural England dataset using EPC register data. Base numbers for social housing stock are not available in this dataset.

* 62 LAs (four projects dropped out of Wave 1 and three LAs had two projects so were only counted once, hence the total is less than 69). Percentages cover both properties that did and did not have measures installed under Wave 1.

** 2021-2022: 221 LAs, 2022-2023: 221 LAs, 2023-2024: 210 LAs. The number of LAs was lower in 2024 due to changes in how LAs were organised over time.

⁷ This is calculated based on 16,056 properties with measures installed in Wave 1 (source: SHDF official statistics) compared to the total social housing stock in England (at the start of Wave 1) of 3,961,000 (source: English Housing Survey 2021-22, Table DA 1101).

6. Conclusions

Evidence from this case study shows that retrofit works in social housing were carried out outside of SHDF Wave 1 during the same period. Some of the energy efficiency installations were supported by internal LA funding, while others were delivered through government retrofit schemes (mainly ECO4, and to some extent ECO3, HUG1, LAD3 and GBIS).

Evidence from the SHDF Wave 1 process evaluation report⁸ indicates that most LAs that took part in the scheme would have undertaken retrofit works to a more limited extent, and possibly lower quality, without scheme funding. Thus, SHDF Wave 1 supported the delivery of retrofit at scale, but it was not the sole contributor to improving the energy efficiency of social housing during this time period.

7. Data sources used in this case study

This case study draws on the following data sources:

Secondary data

Defra (2024) 'Energy Statistics for Rural England: Energy Supplementary Data Tables'. Available at: www.gov.uk/government/statistics/energy-statistics-for-rural-england

House of Commons Library (2025) 'Local authority data: housing supply'. Available at: <https://commonslibrary.parliament.uk/local-authority-data-housing-supply/>

Arun District Council (2026) 'Carbon Neutral Strategy'. Available at: www.arun.gov.uk/carbon-neutral-strategy/

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Barnet Homes (2022) 'Barnet Homes Annual Report 2021-22'. Available at: www.barnethomes.org/download/barnet-homes-annual-report-2021-22/

Barnet London Borough (2021) 'Sustainability Strategy Framework'. Available at: <https://barnet.moderngov.co.uk/documents/s69067/Sustainability%20Strategy%20Framework.pdf>

Barnet London Borough (2023) 'Barnet awarded £2.9m to improve energy efficiency in borough's council homes'. Available at: www.barnet.gov.uk/news/barnet-awarded-ps29m-improve-energy-efficiency-boroughs-council-homes

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Barnet London Borough, 'Sustainability - BarNET Zero'. Available at: www.barnet.gov.uk/sustainability-barnet-zero

⁸ DESNZ (2024) '[Social Housing Decarbonisation Fund Wave 1: process evaluation report](#)'

Broadland District Council, 'Environmental Strategies and Delivery Plans'. Available at: www.southnorfolkandbroadland.gov.uk/environment/environmental-strategies-delivery-plans

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Bury Council 'Improving Energy Efficiency in Bury'. Available at: www.bury.gov.uk/housing/safe-warm-homes/improving-energy-efficiency-in-bury

DESNZ (2023) 'Green Homes Grant Local Authority Delivery (LAD) and Home Upgrade Grant (HUG) release, July 2023'. Available at: www.gov.uk/government/statistics/green-homes-grant-local-authority-delivery-lad-and-home-upgrade-grant-hug-release-july-2023

DESNZ (2025) 'Household Energy Efficiency Statistics, headline release January 2025'. Available at: www.gov.uk/government/statistics/household-energy-efficiency-statistics-headline-release-january-2025

East Riding, 'Climate change - what we do'. Available at: www.eastriding.gov.uk/environment/sustainable-environment/climate-change/climate-change-what-we-do/

East Riding, Housing Strategy and Policy. Available at: www.eastriding.gov.uk/council/plans-and-policies/other-plans-and-policies-information/housing-strategy/housing-strategy-and-policy/

ONS (2022) 'Energy Efficiency of Housing, England and Wales, local authority districts, all records up to financial year ending March 2022'. Available at: www.ons.gov.uk/peoplepopulationandcommunity/housing/articles/energyefficiencyofhousinginenglandandwales/2022

Gedling Borough Council, 'Carbon Management Strategy and Policy'. Available at: www.gedling.gov.uk/resident/environmentalhealth/climatechange/carbonmanagementstrategyandpolicy/

Lichfield District Council, 'Developing our new local plan 2043'. Available at: www.lichfielddc.gov.uk/planning-policy/local-plan-review

Lichfield District Council, 'Housing strategies and policies'. Available at: www.lichfielddc.gov.uk/housing/download-housing-strategies

Lichfield District Council, 'Internal carbon reduction action plan'. Available at: www.lichfielddc.gov.uk/downloads/download/339/climate-change-action-plan

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ONS (2023) 'Statistical Digest of Rural England: 8 - Energy Supplementary Data Table'. Available at: www.gov.uk/government/statistics/energy-statistics-for-rural-england

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Wiltshire Council (2022) 'Climate Strategy and update on council's response to the climate emergency'. Available at: [https://cms.wiltshire.gov.uk/\(S\(hniswsj4w151yf55bd0kmu55\)\)/documents/s197964/Climate%20Strategy%20and%20update%20on%20councils%20response%20to%20the%20climate%20emergency.pdf](https://cms.wiltshire.gov.uk/(S(hniswsj4w151yf55bd0kmu55))/documents/s197964/Climate%20Strategy%20and%20update%20on%20councils%20response%20to%20the%20climate%20emergency.pdf)

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Wiltshire Council (2024) 'Annual Report for Tenants and Leaseholders 2023/2024'. Available at: www.wiltshire.gov.uk/media/12362/Annual-Report-to-Tenants-and-Residents/pdf/Annual_Report_2023-2024.pdf?m=1723043233823

Wiltshire Council, 'Home energy efficiency'. Available at: www.wiltshire.gov.uk/public-health-home-energy

Desk review of social housing retrofit among 12 LAs not participating in SHDF Wave 1

This review was undertaken in August 2023. The sample of 12 non-participating LAs was selected by:

- Accessing a list of all LAs in England.
- Removing any LAs that had taken part in SHDF Wave 1, the SHDF Demonstrator, or had been interviewed as part of the Wave 1 evaluation whether they were successful, unsuccessful or non-applicants.
- Random selection after stratification to ensure:
 - A regional spread, with a minimum of one LA per region.
 - A mix of those who owned and did not own their own social housing stock (a minimum of five LAs for each group).

- Inclusion of at least two but no more than five LAs who were participating in SHDF Wave 2.1.

An online desk review of activity for each of these LAs was then undertaken by:

- Searching for and reviewing any published Home Energy Conservation Act reports (HECAs). These were identified for four LAs.
- Review of LA websites for online publications with relevant content. These included climate/decarbonisation strategies, carbon reduction plans and housing strategies.
- Review of secondary datasets for relevant LAs (sources are listed under Secondary Data above).

Interviews with unsuccessful SHDF Wave 1 applicants and non-applicants

The following interviews were carried out between July and September 2023:

- Two interviews with unsuccessful applicants.
- Three interviews with non-applicants (i.e. LAs who engaged with the Social Housing Retrofit Accelerator (SHRA) but who did not go on to apply to Wave 1).

This publication is available from: www.gov.uk/government/publications/social-housing-decarbonisation-fund-wave-1-impact-evaluation

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