UK Government

Social Housing Decarbonisation Fund (SHDF) Wave 2.1

Process Evaluation Report

IFF Research, Technopolis Ltd and Building Research Establishment (BRE)

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Glossary

Term	Description
Air Source Heat Pump (ASHP)	A measure which uses an electricity powered heat exchanger to generate heat from air, to power a central heating system.
Cavity Wall Insulation (CWI)	Insulation installed within the cavity of a typical modern double-thickness wall.
Clean heat	Measures which provide heating in a low-carbon way – includes all types of Heat Pumps, Solar Thermal and Hybrid Boilers, but not Solar Panels (which generate electricity).
Co-funding	There was a co-funding requirement to maximise the number of properties that could be retrofitted with the funds available. For Wave 2.1, DESNZ required grant recipients to provide co-funding of at least 50% of the total fund requested, up from 33% for Wave 1.
Combined Authority	A Combined Authority is a sub-regional authority, typically covering an urban area. It is not a landlord, but may co-ordinate a consortium.
Cost caps	A cost cap (in scheme rules) is the maximum amount of money that an SHL may budget to spend on measures for an individual property.
Customer Relationship Management (CRM) system	A software / IT system for managing data regarding the relationship between an organisation and a group of clients and/or stakeholders.
Delivery Agent (DA)	The Delivery Agent (Salix) are contracted by DESNZ to support the successful delivery of the scheme through the management of a third-party Delivery Partner (DP) contract(s), oversight of their activities and through the provision of an Intelligent Client Function (ICF) that facilitates and enables continual improvement in scheme delivery.
Delivery Partner (DP)	The DP – a consortium led by PwC and supported by Arup and Turner & Townsend – acted as a first point of contact for all social housing landlords (SHLs) that received funding. Responsibilities included frontline engagement with projects, monitoring progress and risks and providing expert support and assurance where necessary.
Energy Company Obligation (ECO)	ECO is a government energy efficiency scheme in Great Britain designed to tackle fuel poverty and help reduce carbon emissions.

Energy Performance Certificate (EPC)	EPCs provide information on how energy efficient a building is, using a rating from A (very efficient) to G (inefficient).
External Wall Insulation (EWI)	Insulation installed in the form of external cladding, typically on an older property with a solid wall without a cavity.
Fuel poverty	A household is considered fuel poor if living in a property with a fuel poverty energy efficiency rating of band D or below, that cannot be kept warm at reasonable cost without bringing the household residual income below the poverty threshold. Fuel poverty in England is measured using the Low Income Low Energy Efficiency method (LILEE).[1]
Grant Funding Agreement (GFA)	The final agreement between DESNZ and each project to deliver installations / measures in properties as part of Wave 2.1.
Ground Source Heat Pump (GSHP)	A clean heat measure which uses an electricity powered heat exchanger to generate heat from pipes running below the ground, to power a central heating system.
Housing Association (HA)	A sub-type of Social Housing Landlord. Housing Associations are registered with the Regulator of Social Housing to provide social housing at subsidised rents.
Internal wall insulation (IWI)	Insulation installed within rooms of a building on external walls, typically on an older property with a solid wall without a cavity.
Integrated Delivery Team (IDT) at DESNZ	The core Integrated Delivery Team (IDT) at DESNZ managed the SHDF scheme, including setting the policy for the fund and ensuring the fund delivered against agreed key performance indicators and programme benefits.
Local Authority	Local government body providing services to an area of England. District or unitary level councils may operate as Social Housing Landlords (SHLs), referred to as stock-holding Local Authorities.
PAS 2035:2019	To be eligible for funding all projects had to be compliant with PAS 2035:2019 requirements, the British standard for retrofitting dwellings.
Private Registered Provider (PRP)	Private Registered Provider (PRP) is a type of SHL, which excludes stock-holding Local Authorities. As a term it encompasses Housing Associations (HAs), Housing Trusts (HTs), Almshouse Charities and Housing Co-operatives.

[1] Fuel poverty statistics methodology handbooks - GOV.UK (www.gov.uk)

Project leads	The SHLs or related organisations leading bids and projects. This can include organisations running projects as a sole SHL, and organisations leading a consortium.
Project Support Officers (PSOs)	Project Support Officers (PSOs) are DA staff who oversee project delivery.
Retrofit co-ordinators	Commercial sector organisations managing projects (i.e., organising the supply chain, scheduling installations) on behalf of the SHLs or consortia leads. Often referred to by SHLs as 'delivery partners' – not to be confused with the scheme-level Delivery Partner (DP).
Scheme delivery representatives	The term given to individuals in this evaluation who took part in qualitative interviews and focus groups representing the DESNZ IDT, DA, DP and TAF.
Single Point of Contact (SPoC)	SPoCs are DP staff who engage closely with SHLs to provide guidance and monitor delivery, providing them with a single consistent source of information.
Social Housing	Housing which is provided at a below-market cost to the resident, by a landlord registered with the Regulator of Social Housing.
Social Housing Landlords (SHLs)	Landlords providing social housing in which measures are being installed. Encompasses stock-holding Local Authorities and Private Registered Providers (PRPs). Not all landlords involved in delivery of Wave 2.1 projects are SHLs; non-stock holding Local Authorities or Combined Authorities frequently lead projects; one project is led by a charitable landlord not registered with the Housing Regulator.
Social Housing Retrofit Accelerator (SHRA)	The Social Housing Retrofit Accelerator (SHRA) was established to provide technical support for all SHLs interested in applying for funding, to ensure applications to the fund were fit for purpose and their knowledge of retrofit delivery was sufficient. For Wave 2.1 this was provided by the TAF Bridge.
Supply chain stakeholders	The term given to individuals in this evaluation who had responsibility for the installation of measures. This included individual installers responsible for fitting measures, managers of installation teams, senior managers at principal contractors, and retrofit coordinators.
Technical Assistance Facility (TAF) and TAF Bridge	Turner & Townsend were the third-party organisation appointed to deliver the SHRA support for Wave 2.1. They supported SHLs, project leads and retrofit co-ordinators in the implementation phase of projects. Through the SHRA they also supported bidders for funding.

Tenant Liaison Officers (TLOs)	TLOs are individuals employed by SHLs to liaise with residents.
Trustmark	Trustmark is the Government Endorsed Quality Scheme that covers work a consumer chooses to have carried out in or around their home. Installers working on Wave 2.1 projects had to be approved by Trustmark or equivalent.

Executive Summary

Introduction

The Government is aiming to achieve Net Zero emissions in the UK by 2050, including decarbonising homes due to their poor energy efficiency. The SHDF (now replaced by the Warm Homes: Social Housing Fund, or WH:SHF) is administered by the Department for Energy Security and Net Zero (DESNZ) and seeks to improve the energy efficiency of social housing in England through the installation of energy efficiency measures. The Demonstrator, announced in 2020, provided £62 million to test such large-scale retrofitting. Building on this, Wave 1 (operating from Summer 2021 to Spring 2024) awarded £179 million to successful Social Housing Landlord (SHL) applicants. Wave 2.1, launched in September 2022, provided a further £778 million and is due to close in the financial year 2025/2026. Wave 2.2, a 'top-up' competition, allocated £75.5 million in April 2023 and is due to close in March 2026.

DESNZ has commissioned separate process, impact and economic evaluations of both Wave 1 and Wave 2.1. Together, these are assessing both delivery and how successful the schemes have been in working towards their objectives. The findings will ensure accountability for the spending of this programme, provide evidence to improve future design and delivery and assess the overall impact of the measures. This Wave 2.1 process evaluation report assesses delivery effectiveness and project performance, the extent to which lessons are being incorporated from previous waves and how much the design is supporting the achievements of Wave 2.1. The Demonstrator was evaluated separately, and an evaluation of Wave 2.2 will follow.

Methodology

Since Wave 2.1 is an ongoing scheme, this evaluation only covers scheme set up, including the bidding phase, and early delivery. Data used for this report covers installations completed up to the end of July 2024.

The evaluation uses a range of methods to assess the process of delivery, analyse key scheme outcomes and assess value for money:

- This process evaluation is underpinned by a series of Logic Models for the Wave 2.1 scheme which were used to develop a Theory of Change (ToC) and the Evaluation Questions (EQs).
- Primary research comprised a survey and in-depth interviews with residents together with interviews with scheme delivery representatives and SHLs.
- Secondary data analysed included bid data, scheme monitoring data, and statutory data.

Although data is used from across all the Wave 2.1 projects, a total of nine case studies, covering six projects and three thematic areas (Technical Assistant Facility (TAF) Bridge, clean heat measures, and digitalisation funding) were conducted to provide deeper understanding.

Findings from case studies so far are referenced throughout this report. All evidence was synthesised and triangulated to both enrich and test the results from each strand of the research and look for consistent findings. Where possible, findings are compared to those from the Wave 1 process evaluation report.

Design and application process

Interviews with scheme delivery representatives and SHLs revealed that many learnings from the Demonstrator and Wave 1 were successfully incorporated into Wave 2.1 design. The high number and variety of bids suggest the scheme was well publicised. SHLs were motivated to apply to Wave 2.1 by both their own decarbonisation targets and desire to improve resident comfort.

Although some SHLs found the application process complex, with difficulties gathering information on their stock, most found the application requirements aligned with their existing decarbonisation plans and could draw on existing internal resource and experience of energy efficiency retrofit projects. They also felt that the Social Housing Retrofit Accelerator (SHRA) support provided by the TAF Bridge, and external consultant support, were helpful enablers of the process. Some SHLs felt that they could not be involved in both Wave 2.1 and Home Upgrade Grant (HUG) projects simultaneously given the application timelines coincided.

This motivation and support were reflected in both the volume and quality of bids received, with 74% of applications eventually proving successful, totalling £778 million awarded to 107 projects. Overall, 164 of England's Private Registered Providers (PRPs) were involved in successful bids (16% of all PRPs in England). The proportion of funding allocated to consortia did not increase in Wave 2.1 compared to Wave 1, and this may explain why (as for Wave 1) housing held by smaller SHLs was less likely to be included in the scheme than housing held by larger SHLs. Bids achieved an average of 59% match funding, higher than the minimum of 50%.

At the point of grant funding award in March 2023, key estimated figures included:

- **296,907 measures** were planned to be installed across **94,096 properties** (an average of 3.2 per property), most often loft insulation and improved ventilation.
- **Clean heat installations accounted for 3% of measures**, and 10% of overall funding.
- Homes receiving measures included all stock types, although **terraced and semi-detached houses were the most common** (34% and 31% respectively) and over-represented compared to housing stock reported in the English Housing Survey, whereas flats were under-represented (21%).
- Most properties planned to be retrofitted had an **EPC rating of D** (87%).

SHLs felt that, overall, this represented significant additional, faster paced and higher quality installation activity compared to the retrofit works they would have otherwise carried out on their stock.

Delivery

Analysis of DESNZ scheme monitoring data to the end of July 2024 indicated that that nearly all projects (92%) had completed MS2 (procurement of supply chain), and about four in ten (42%) had started their installations (MS7).[2] There was no notable variation by project size, region, consortium status or the type of lead organisation in progress to starting installations. Some projects had experienced initial delays in the mobilisation of the Delivery Agent (DA) and Delivery Partner (DP). Project monitoring was generally considered successful in managing risks and contractual changes but less effective in monitoring progress with delivery. Many projects failed to submit delivery data on time, with stakeholders pointing to a variety of reasons from the burden of collecting it to difficulties with the inflexibility of the reporting form.

Delivery progress has been slower than intended, although this is likely to be partly due to reporting delays by projects. By the end of July 2024, project delivery progress was as follows:

- Projects reported having delivered, or intending to deliver, installations in 87,811 properties, **a descoping of 7% from the total intended at bid stage**. By the end of Wave 1, a larger proportion of properties were descoped (18%). However, further descoping may occur by the end of Wave 2.1.
- **DESNZ SHDF statistics indicate 13,926 measures had been installed in 6,519 properties by the end of July 2024** (7% of all properties due to receive measures). Progress has generally been slower for flats than houses and bungalows.
- Among properties where work has been completed and an EPC rating provided for both pre and post installation, **the proportion of properties receiving a rating of A to C has risen from 2% to 99%.**

Project plans from change control data show a greater descoping in terms of measures than properties (indicating a reduction in the number of measures to install per property), falling by 21% from bid stage to 235,020 measures in project plans at the end of July 2024 (2.7 measures per property on average, down from 3.2 in applications). This compares to a 10% descoping in terms of measures for Wave 1, which resulted in an increase in average measures proposed per property, from 2.2 to 2.4. However, very few ventilation measures and glazing were included in Wave 1 bids, and much of the increase in measures per property related to their addition to plans.

GSHPs, underfloor insulation, ASHPs, CWI and windows were most likely to be descoped. Progress varied by type of measure, with solar panels furthest ahead (12% of planned measures installed), and underfloor insulation furthest behind (2% installed).[3] In terms of costs:

- Around **36% (£682.2 million) of the £1,881.5 million spending** proposed in the latest project plans (covering 2.5 years to September 2025) was reported to have been **spent by July 2024**.

[2] Using a combination of SHDF project summary monitoring data and property-by-property delivery data. This is likely to be an underestimate due to projects sending delivery data late; see discussion at Figure 4 and Figure 6.
[3] Excluding draughtproofing for which progress appears to be patchily logged, and Ground Source Heat Pumps where installations exceed planned levels, likely due to confusion in data recording with Shared Ground Loops.

- Only £52.4 million was reported to have been spent on the installation of measures over the same period. This is likely to be an underestimate, given that costs data was available for only 13% of all measures planned to be installed as part of Wave 2.1.
- Where cost data has been provided, **installation costs are frequently higher than planned in bids** (e.g., +17% for EWI and +7% for ASHP), **although cost inflation seems less severe than Wave 1** (e.g., +25% for EWI, +19% for ASHP).
- **Highest per measure costs were incurred by the smallest projects**, with those retrofitting fewer than 250 properties paying 39% more than the average cost (for projects as a whole) for measures of the same type.
- Larger projects led by a single organisation with 1,000 or more properties paid 4% less than the average cost for measures they installed. However, consortia retrofitting 1,000 or more properties still paid 1% more than the average cost, likely because of higher administrative costs.

The risk management process was reported to be robust but did not always reduce the impact of some of the most severe risks such as cost inflation and delivery timescales. The occurrence of these risks tended to be attributed to delays in the awarding of funding and lack of accurate assessments of properties planned to have measures installed. Asbestos was also the most commonly mentioned technical issue impacting the progress of installations. More recently, as installations got underway, resident engagement had risen to be the third most common ‘severe risk’ logged by projects. Explanations included difficulties working through holiday periods and difficulty rescheduling delayed installations as well as some concerns about certain measures and lack of understanding about the wider benefits.

Developing and managing the supply chain

SHLs typically harnessed existing relationships with the supply chain when procuring for Wave 2.1, although often needed additional support to deliver the scale of work required. Therefore, some SHLs undertook a range of new procurement processes, including developing pricing frameworks for better cost management. In turn, suppliers were motivated to tender for work funded by SHDF by value, long term security and scope for their own business development.

Some supply chain stakeholders reported that the additional administration required to implement the required PAS2035 standards and achieve Trustmark accreditations was burdensome. However, most believed these standards helped ensure installations were of high quality.

The volume of work required from the supply chain led to some delays in Wave 2.1 delivery. Some supply chain stakeholders increased their recruitment and training provision, among various options to increase supply chain capacity, but others did feel they had to decide whether to prioritise taking part in one government scheme over another. The most cost-efficient installations were achieved when supply chain stakeholders could work on larger volumes of homes in close proximity, in line with Wave 1. Some supply chain stakeholders commented further on the scale of SHDF projects and reported that the larger the scale, the more efficiently installations could be carried out, resulting in better value for money.

Resident engagement and installation experience

At the time of the survey, works were completed for 24% of surveyed residents, still ongoing for over one in five (22%) or not started for nearly half (47%). The remainder were not sure of the status of their installations. Work was more likely to be complete when less disruptive installations, such as lighting, ventilation, and heating controls had been planned, compared to, for example, hybrid boiler installations. Prior to the survey, nearly three-quarters (74%) of residents were aware of their upcoming installations, with nearly one third of this group (32%) aware that it was funded by the SHDF. Residents were typically made aware via letters or home visits.

In terms of resident engagement with the scheme:

- Residents were **motivated** to receive SHDF funded installations to **make their homes warmer (61%), save on energy bills (60%),** modernise their homes (54%), and reduce energy use (48%).
- **Over one third (36%) did not realise they had a choice** about whether or not to take part in the scheme.
- SHLs reported that refusal rates were extremely low, but if a resident in a block of flats refused, this could sometimes stop wider work going ahead.
- **SHLs reported having to often deal with low engagement**, such as refused access to properties. SHLs employing a dedicated liaison officer reported the highest level of co-operation from residents.

Residents generally did not have major concerns in the run up to the installations. Over half (56%) found the scheduling of the installation as convenient as it could have been, whereas 20% did not find it convenient. Residents from the latter group tended to be younger, live in flats and be in paid work. They typically wanted more choice about installation dates, more information about how long it would take, and for installers to turn up when expected. Overall, fewer than half of residents were satisfied with the communication and information from their landlord (46%) or installer (42%) or information about the measures (48%). Satisfaction rates were higher (61%) for residents whose works had completed compared to those whose works were ongoing (54%) or had not yet started (36%).

Residents with completed or ongoing works were generally positive about the installation, although also reported delays, cancellations and other frustrations with contractors. Some were looking for more or different guidance on how best to use the new measures. Nearly two thirds (65%) had not experienced any new issues with their home since the measures were installed. Among those that had, the most frequent issue was managing to heat their home to a comfortable temperature even with the heating on (7%).

Residents' views of their home and energy efficiency

A large proportion of surveyed residents typically reflected on the difficulties they faced with their home prior to installation:

- Before the measures were installed, nearly all residents reported or recalled at least one problem with their home, most commonly the cost of heating it to a comfortable temperature (63%) and draughts (62%).
- Most found their energy bills unaffordable, and many were keeping their homes colder than they would like, often with health consequences.
- Only one third (32%) said their energy bills had been affordable in the last 6 months, but this rose to 45% among those where work was completed on their home.

After works had been completed, residents were more likely to feel that their home was warm and comfortable (43% compared to 20% among those in homes where works had not yet started) and reported that their homes remained warm for longer after they switched the heating off. They also felt more able to use their heating as much as they liked when cold outside.

Residents were generally interested in improving the energy efficiency of their home (83%) most commonly to save money on energy bills, improve their health and reduce their carbon footprint.

Changes from Wave 1 to Wave 2.1

Learnings from the Demonstrator and Wave 1 were successfully incorporated into Wave 2.1 design; SHLs frequently cited more realistic timescales, and improved forms and data collection. Following SHLs' experience of previous waves, costs per measure in Wave 2.1 bids were in line with actual costs experienced at Wave 1, and Wave 2.1 bids included a greater proportion of enabling works, such as ventilation and glazing measures. SHLs also seemed more likely to correctly inform their residents that measures were optional; 36% of Wave 2.1 residents felt they had no choice about receiving measures, compared to 50% of Wave 1 residents.

In interviews, SHLs mentioned that participating in Wave 1 had improved their stock knowledge, a key barrier at Wave 1, and supply chain stakeholders seemed to have improved PAS 2035 knowledge. However, mobilisation at Wave 2.1 was noted to be slower than Wave 1. While a broader range of organisations led Wave 2.1 bids compared to Wave 1, and co-funding increased from 51% in Wave 1 to 59%, the proportion of funding allocated to consortia did not significantly increase at Wave 2.1 compared to Wave 1. Consortia projects accounted for 52% of overall funding, down from 69% in Wave 1. The aim of boosting the installation of clean heat measures was successful, with this accounting for 10% of total Wave 2.1 spending on measures, twice that of Wave 1 (5%).

Descoping has so far been more limited in Wave 2.1 (7% of properties vs 18% in Wave 1), although Wave 2.1 is at an earlier stage. Cost inflation seems less severe than Wave 1, although still noted as a key risk for projects. Some interviewed SHLs mentioned that Wave 1 had improved their risk mitigation processes.

1 Introduction

Introduction to the scheme

The UK has legislated to reduce greenhouse gas emissions to Net Zero by 2050. The UK has some of the oldest and least energy efficient homes in Europe. To reach Net Zero, it is necessary to almost entirely decarbonise homes. The Social Housing Decarbonisation Fund (SHDF, now replaced by the Warm Homes: Social Housing Fund, or WH:SHF) is administered by the Department for Energy Security and Net Zero (DESNZ) and seeks to improve the energy efficiency of social housing in England through the installation of energy efficiency measures.

The Demonstrator Fund was announced in the 2020 Summer Economic Update and awarded £62 million for Social Housing Landlords (SHLs) to test innovative approaches to retrofitting at scale. Building on the Demonstrator, the Main Fund has taken a waved approach. Wave 1 ran from Summer 2021 until Spring 2024, awarding £179 million to successful SHLs. Wave 2.1 launched in September 2022, awarding £778 million of funding from March 2023, and is due to close in September 2025. The Wave 2.2 ‘top-up’ competition allocated a further £75.5 million of funding in April 2023 and is due to close in March 2026.

Evaluation aims and objectives

Aims of the evaluations

DESNZ commissioned separate process, impact and economic evaluations of both Wave 1 and Wave 2.1. The overall aim of the evaluations is to evaluate delivery and assess how successful the schemes have been in working towards their objectives. In addition, the evaluations aim to:

1. Provide accountability for public spend on the scheme.
2. Improve the design and delivery of future waves of the scheme.
3. Provide case-related insights into key barriers and drivers to effective delivery and impact.
4. Provide an evidence-based narrative and summary of the impact of the scheme.

The evaluations cover nine overarching research questions (each with a number of subsidiary questions); these are presented in the Technical Annex accompanying this report.

Purpose of this evaluation report

This is the final report for the Wave 2.1 process evaluation, which assesses how Wave 2.1 was delivered and how learnings can inform future waves. This report primarily responds to the following four research questions:

1. How effectively has Wave 2.1 been implemented and delivered?
2. To what extent and how have Wave 2.1 projects performed as intended?
3. To what extent and how has Wave 2.1 incorporated lessons learned from other DESNZ energy efficiency schemes, the Demonstrator and Wave 1, to inform the design and delivery of the waves?
4. To what extent and how has the design of Wave 2.1 effectively supported both wave-level and overall scheme achievements?

Data collection and analysis for this process evaluation concluded well before scheme completion, with delivery initially planned for completion in September 2025. The report draws on primary data collection with residents living in properties planned to be retrofitted, SHLs (successful and unsuccessful applicants), scheme delivery representatives, and installation stakeholders, as well as analysis of scheme data up to July 2024.[4]

The report makes comparisons to Wave 1 where possible, based on findings from the Wave 1 process evaluation report which was published in Autumn 2024. This Wave 2.1 process evaluation report includes the following chapters:

- Chapter 2: Methodology.
- Chapter 3: Design and application process.
- Chapter 4: Delivery.
- Chapter 5: Developing and managing the supply chain.
- Chapter 6: Resident engagement and installation experience.
- Chapter 7: Residents' views of their home and energy efficiency.
- Chapter 8: Conclusions.
- Appendices

The Wave 2.1 Impact and Economic Evaluation Report will be produced in Spring 2026 for publication later in 2026.

[4] As evaluation activities concluded before final project delivery completion, findings should not be considered final. Where relevant, the Wave 2.1 impact and economic evaluation report will contain updated findings following subsequent evaluation activities.

2 Methodology

This chapter summarises the methodological approach underpinning this evaluation. A full methodology is available within the Technical Annex accompanying this report.

Methodological approach

The Wave 2.1 evaluation takes a mixed methods approach to assess the process of delivery, analyse key scheme outcomes, and assess value for money. This process evaluation report draws on surveys and interviews with stakeholders and scheme beneficiaries, and secondary data, synthesising findings against process evaluation questions (these are presented in the Technical Annex accompanying this report).

In an initial scoping phase, the evaluation team first developed a series of Logic Models for the Wave 2.1 scheme, and used these to derive a Theory of Change (ToC), from which Evaluation Questions (EQs) were produced. A methodological approach was then devised, incorporating both primary and secondary data, designed to answer the EQs. As part of this, the evaluation team engaged an expert panel to provide scrutiny and quality assure the approach. The analytical approach is described in the next section.

While this report covers Wave 2.1 as a whole, the evaluation approach also incorporated a case study methodology to explore projects and themes of particular note. This informed the sampling for interviews with SHLs, supply chain stakeholders and residents. This resulted in nine Wave 2.1 case studies covering six projects and three thematic areas (TAF Bridge, clean heat measures, and digitalisation). Findings to date are referenced throughout this report.

Primary data collection

The process evaluation drew on primary data collected among residents, scheme delivery representatives, SHLs and supply chain stakeholders. Fieldwork occurred between September 2023 and August 2024. Table 1 summarises fieldwork activities which contributed to this report. A detailed summary of all methodological strands is included within the Technical Annex, including detail on sampling techniques.

Table 1: Primary data sources used within this report

Title	Description	Timings	Content
Residents			
Pre-installation survey of participating residents	1,867 responses via an online and telephone survey, from an issued sample of 12,532. The sample covered 63 out of 104 projects and was weighted to ensure the dataset was representative of properties planned to receive installations through Wave 2.1.	Tranche 1: Sep-Oct 2023 Tranche 2: Nov-Dec 2023 Tranche 3: May-Aug 2024	Background information (e.g., measures installed, demographics), experience of the home (e.g., issues with the home, thermal comfort, affordability).
Pre-installation interviews with participating residents	150 in-depth interviews with residents who took part in the survey, from 42 projects. Conducted on an opt-in basis.	Tranche 1: Sep-Nov 2023 Tranche 2: Dec 2023-Jan 2024 Tranche 3: July-Aug 2024	More detailed exploration of communication around installation, motivations and concerns, and perception of energy efficiency.
Scheme delivery representatives			
Scheme delivery representatives	5 individual interviews with 4 DESNZ senior officials and 1 senior Delivery Agent representative.	June and July 2023	Lessons learned for scheme design, pre-competition engagement, application and appraisal processes, early stages of project delivery and scheme management.
Scheme delivery representatives	3 focus groups: One with DESNZ Integrated Delivery Team (IDT) representatives. One with Technical Assistance Facility Bridge (TAF Bridge) representatives One with Delivery Partner (DP) representatives	IDT focus group: July 2023 TAF Bridge and DP focus groups: Sep 2023	Pre-competition engagement, application and appraisal processes, early stages of project delivery and scheme management.

Supply chain stakeholders			
Supply chain stakeholders	24 interviews across 19 projects.	February and May 2024	Understanding of SHDF and reasons for involvement, Activities being conducted as part of the scheme, Communications with SHL, Challenges and barriers to delivery of installations, Perceived quality of work, Capacity, training and accreditation, Value for money of installations, External factors affecting installations, Realisation of project benefits, Broader view on government schemes and support options.
Social Housing Landlords			
Participating SHLs (from projects selected to be case studies)	8 semi-structured interviews with representatives of 7[5] projects.	Tranche 1: July & August 2023	Pre-existing retrofit plans and activity, application process, and early project delivery.
Participating SHLs (from projects selected to be case studies)	7 semi-structured interviews with representatives of 6 projects.	Tranche 2: May to July 2024	Progress in project delivery including project preparation, resident engagement, installation supply chain procurement and management, and experiences of scheme management.
Unsuccessful SHL applicants	7 in-depth interviews with SHLs who were not successful in their application.	July & August 2023	Retrofit activity undertaken outside of Wave 2.1, and views and experiences of applying to Wave 2.1.

[5] There will be six SHL project case studies. Two case study projects were provisionally selected but were replaced during tranche 2 due to lack of responsiveness. Further details are available in the Technical Annex. In both tranche 1 and tranche 2 one additional interview was undertaken with a partner organisation for one of the case study projects. Hence there was one more interview than the number of projects.

Further evaluation work is planned, including further tranches of research with residents, SHLs and scheme delivery representatives.

Secondary data sources

The process evaluation also made use of extensive secondary data, including bid data, scheme monitoring data, and statutory data, as shown in Table 2.

Table 2: Secondary data sources used within this report

Title	Description	Content
Bid data	Data submitted by projects as part of their bids (successful and unsuccessful), compiled by DESNZ during the bidding process.	Project-level data on proposed installations of measures, types and broad location of properties included, proposed costs, proposed grant and co-funding, organisations involved.
Change Control register (latest project plans)	Contractual data submitted by projects showing intended delivery under their Wave 2.1 grant agreements with DESNZ.	Project-level data on proposed installations of measures, and numbers of properties included, as well as overall and per-measure costs data.
Delivery data (from the Data Management System, or DMS): property details	Data submitted by projects on a monthly basis outlining their progress in delivering installations at a measure and property level.	Property-level data including type and age of property, pre- and post-installation Energy Performance Certificate (EPC) rating, and property location.
Delivery data (from the DMS): measure details	Data submitted by projects on a monthly basis outlining their progress in delivering installations at a measure and property level.	Measure-level data including type of measure, timing of installation and cost.
Monitoring data (Forecast / Actuals data, from the DMS)	Data submitted monthly by projects regarding their progress toward Key Performance Indicators (KPIs).	Project-level data on progress, including headline spending, KPIs regarding number of properties assessed and completed, and key administrative milestones. Includes baseline data and monthly updated progress data.

Risk data (from the DMS)	Data submitted monthly by projects regarding project risks.	Risk-level data detailing each risk identified, relating either to projects or central scheme functions. Risks use a RAG-based classification. Data includes detail text discussion of risks and mitigations.
Project summary data (from the DMS)	Data submitted monthly by projects regarding project progress.	Project-level data detailing RAG ratings of the risk level attached to project milestones, and text data on project progress, detailed nature of risks and mitigations. Also contains text assessments of general project progress. Text data was analysed for this project using NVivo.
SHDF Statistics (official statistics)	Data published by DESNZ[6] on the progress of SHDF activity, covering properties and measures.	Official statistics based on the DMS data referenced above, but processed within DESNZ, and therefore may produce subtly different results.
English Housing Survey (EHS)	An annual MHCLG survey examining condition and quantities of housing in England.[7]	Used for comparative profile of social housing stock, for assessing the scheme's coverage of the eligible housing stock.
Regulator of Social Housing Statistical Data Return (SDR)	Survey of social housing stock and rents in England, among registered providers of social housing[8].	Used for providing lists of landlords and their stock, for assessing the scheme's coverage of organisations in the social housing sector.
Regulator of Social Housing Local Authority Data Return (LADR)	Survey of social housing stock and rents in England, among stock-holding local authorities[8].	Used for providing lists of landlords and their stock, for assessing the scheme's coverage of organisations in the social housing sector.

Analysis

Quantitative data from the participating resident survey was weighted to make it representative of the Wave 2.1 resident population. Further details on the weighting approach are provided in

[6] DESNZ (2024) Social Housing Decarbonisation Fund statistics. Social Housing Decarbonisation Fund statistics - GOV.UK
[7] MHCLG (2023) English Housing Survey. English Housing Survey - GOV.UK (www.gov.uk)
[8] Regulator of Social Housing (2023) Statistical Data Return and Local Authority Data Return. Registered provider social housing stock and rents in England - GOV.UK (www.gov.uk)

the Technical Annex. Only responses between sub-groups that are statistically significant at the 95% confidence level are highlighted in this report.

Interviews and focus groups were coded and analysed thematically using a framework analysis approach that mapped topics back to the evaluation questions. This enabled the evaluation team to determine common themes, relationships between themes, and how experiences and attitudes compared between different stakeholder types.

A triangulation approach was used to synthesise evidence. This helped to enrich the analysis, as data from one source could contextualise or add nuance to data from another source. To support triangulation, themes covered in primary data collection, as well as secondary data sources were mapped against the relevant process evaluation questions, to show where different sources informed the same research question. The report emphasises where findings are consistent across different data sources.

Research Limitations

Although this report draws on multiple sources of primary and secondary data, it is still subject to some limitations:

- **Representativeness of resident survey**: The achieved sample was slightly lower than planned (1,867 compared to a target of 2,000). This was not due to a lack of supplied contact details (12,532), but primarily due to the final (and largest) tranche of fieldwork being paused to account for the UK pre-election period in May-June 2024. This reduces the statistical robustness of the survey. Furthermore, 44 out of the 104 projects were not represented in the resident survey, while other projects were under-represented relative to the number of properties they retrofitted. This was because these projects had not supplied details of any specific properties and/or residents prior to survey. Weighting was applied to the survey data to mitigate this issue, but it should still be noted that data will reflect projects who submitted resident data by the end of April 2024, in time for survey sampling.
- **Self-selecting nature of research with residents**. Residents could choose not to take part in the quantitative survey; they also opted in to qualitative interviews following the resident survey. Respondents may therefore be more likely to be ‘engaged’ residents and have motivations to take part in voluntary research, introducing bias. To help mitigate against this, quantitative survey data was weighted to mitigate this issue, and residents with different personal and property characteristics were selected for qualitative interviews. Looking at differences in survey responses between residents that opted in to interviews and those that didn’t, those taking part in interviews were more likely to be interested in saving energy, and less likely to be satisfied with communication from their landlord. Therefore, responses related to saving energy for environmental reasons, or regarding a negative relationship with their landlord, may be slightly over-represented in interviews.

- **Lack of representation from non-participating residents**. The Wave 2.1 evaluation design did not incorporate interviews with non-participating residents, given feedback was expected to be similar to that gained in the Wave 1 evaluation. However, owing to poor quality sample, the Wave 1 evaluation managed to capture only three interviews with non-participating residents. The evaluation is therefore limited in its assessment of how well SHLs promoted to residents, and the barriers experienced by residents to participate, given feedback is from residents who received measures.
- **Lack of coverage of SHL and scheme delivery stakeholder perceptions on delivery.** In line with the evaluation design, to minimise the burden on these stakeholders, the views of scheme delivery representatives were only captured before delivery commenced, while the number of SHLs interviewed about delivery was relatively low (seven interviews representing six projects). This means the evaluation is more reliant on secondary data to understand the barriers and enablers to project delivery than reflections gained from the primary research.
- **Quality of delivery data,** while much improved from early monitoring, was a limiting factor for some analyses. In particular, projects tended to report installations of measures in properties late. Therefore, estimates of delivery in the most recent few months tend to be low, because some installations which have taken place are likely not reported yet. This results in charts showing delivery over time always indicating a drop-off in provision in the most recent few months, potentially hiding actual trends in delivery. To mitigate against this, we have used date of reporting in charts to help to visually illustrate the problem. Costs data was also not supplied at a measure level by all projects, reducing sample size for these analyses. In addition, data on employment of installers and apprentices appeared inconsistent from project to project,[9] resulting in limited analysis of this information and therefore less meaningful findings.
- **Use of scheme data and official statistics**. Throughout the report we used published official statistics for measurement of delivery where available, including numbers of properties retrofitted and measures installed. Where official statistics were not available (e.g., for sub-group analysis of properties retrofitted or planned to be retrofitted), we used monthly delivery data compiled by projects. Delivery and monitoring data is the same source used to develop official statistics.[10] Information regarding the most recent plans of projects as of the end of July 2024 including work yet to be done (referred to in the report as ‘properties retrofitted or planned to be retrofitted’, or ‘measures installed or planned to be installed’) is taken from the Change Control register, since this does not feature in official statistics.

[9] E.g. definitions of ‘installer’ varied from numbers of individuals to numbers of main contractors. Data on apprentices was unaffected by this, but only measured the number of apprentices working in a given month, rather than cumulative number started on apprenticeships or successfully completing them.
[10] Figures differ since the cleaning process is different. In the few cases where delivery data was used instead of official statistics (three tables in the report) this was clearly signalled and explained in the footnote to the table.

3 Design and application process

This chapter covers the design of Wave 2.1 and the process of applying for funding. This includes how and whether Wave 2.1 reached the intended group of applicants, and the extent to which the Social Housing Retrofit Accelerator (SHRA) and the design of Wave 2.1 effectively supported this. Additionally, this chapter examines the targeting of measures as outlined in bids relative to the goals of the policy, and the extent to which installations might have happened without Wave 2.1.[11] This chapter primarily draws on evidence from interviews with successful and unsuccessful SHLs and scheme delivery representatives, the Wave 2.1 Business Case and project bid data.[12] It highlights where findings substantially deviate from those identified within the Wave 1 process evaluation.

Design

Learnings from the Demonstrator and Wave 1 were successfully incorporated into Wave 2.1 design, including eligibility requirements and the application process.

Scheme delivery representatives reported that sector engagement, carried out to inform the design of Wave 2.1, was a meaningful exercise in which DESNZ could refine the eligibility criteria for the scheme, such as co-funding requirements. One scheme delivery representative felt that they had built a robust, open relationship with many in the sector, which was useful to know what worked well and what did not.

The following scheme design changes reflected learnings from the Demonstrator and Wave 1 as well as the scale and size of the Wave 2.1 fund and policy priorities within DESNZ and wider government strategies:

- Wave 2.1 aimed to engage a wide range of SHLs, with eligibility being widened compared to Wave 1. SHLs were eligible to bid without a Local Authority and charitable organisations were now also able to bid. This was following recommendations from housing providers that some of these organisations may provide housing to particularly vulnerable populations that would have otherwise not been reached.
- Delivery timescales were lengthened to increase the scope and scale of works for SHLs.
- A minimum bid size of 100 homes with an EPC rating of D to G was introduced to reflect the increased scale of funding to be awarded. None of the interviewed applicants reported this requirement to be a challenge (see ‘Enablers to the application process’

[11] Evaluation questions addressed in this chapter: 1.1, 1.2, 1.3, 1.4, 1.11, 2.1, 3.1, 3.4, 4.1, 4.3, 4.4, 4.5, 4.6, 4.7, 4.9, 6.1, 8.3 and 8.4.

[12] While the evaluation consulted the teams or organisations involved in scheme management and delivery separately (DP, DA, TAF Bridge and DESNZ staff and IDT), some participants’ concerns about anonymity mean that it cannot be specified which teams reported certain findings. ‘Scheme delivery representatives’ are therefore referred to, to cover all of these respondents. It is stated throughout the report where there were differing views among groups of respondents.

section), and some scheme delivery representatives felt this could have been even higher.

- A separate cost cap was introduced for low carbon heating in off grid homes to help increase the number of clean heat measures, such as heat pumps, planned by SHLs. This aimed to help mitigate the relatively low proportion of clean heat measures planned and installed as part of the Demonstrator and Wave 1. Some successful and unsuccessful SHLs felt that the cost caps were set too low, particularly to incentivise clean heat measures such as GSHPs.

To refine scheme guidance for Wave 2.1, DESNZ also carried out a review at the end of Wave 1 to understand how application guidance had affected bids. The following changes were made to the Wave 2.1 competition process to incorporate lessons learnt from the Demonstrator and Wave 1:

- The Wave 2.1 assessment process (unlike Wave 1) had more regular moderations and set days by which bid assessors needed to complete their assessments. Scheme delivery representatives thought this made the process much faster and more robust.
- In designing the Wave 2.1 application form, DESNZ reportedly found a better balance between getting the necessary granularity of data and making the application too time consuming, compared with Wave 1. Scheme delivery representatives thought the addition of more Excel sheets and a Word document component, allowed larger consortia to include their data more easily. This change was requested by sector stakeholders and was thought to have improved the experience for both applicants and assessors.
- The Wave 2.1 application window was extended to give SHLs enough time to understand the nuances of the application guidance. This followed feedback from Wave 1 SHLs that application timescales had been challenging, despite being two weeks longer than for the Demonstrator. However, some Wave 2.1 applicants still felt that the time frame was a barrier to applications (see 'Challenges with the application process' section).

Promoting the scheme to Social Housing Landlords

The high number and variety of bids suggests the scheme was well publicised. SHLs were motivated to apply due to existing Net Zero and decarbonisation targets and desire to improve resident comfort.

Scheme marketing

Scheme delivery representatives reported that, similarly to Wave 1, to promote engagement with Wave 2.1, the TAF Bridge mapped housing providers against volume of stock and focused on those with 2,000 homes or more. Scheme delivery representatives operated within the regions they were based in, or had experience within, to be able to more easily conduct visits and have a stronger contextual understanding. The team used a variety of engagement

channels throughout each region in September 2022, such as weekly email bulletins, briefings, master classes, round table discussions, and conferences, including through Net Zero Hubs and the House of Commons. A customer relationship management tool was also used to engage with, email, or visit organisations.

The high number of bids and scale of funding awarded suggests that the scheme was well marketed, with a variety or applicant types, sizes, and regional spread. This is seconded by positive feedback on the SHRA marketing and support from the scheme delivery representatives and a number of applicants.[13]

Interviewed applicants noted a variety of channels through which they heard about the Wave 2.1 competition. Most interviewees were already expecting the bid to be announced due to experience in or knowledge of Wave 1. Others said they kept a close eye on the market for these opportunities and had relevant involvement and communications with DESNZ. Three applicants said they heard about the bid through an email, with one explicitly citing the TAF Bridge outreach.[14]

Several interviewed applicants noted that the early publication of the Wave 2.1 competition guidance enabled applicants and the SHRA to have a better understanding and more time to develop bids. This was also supported by SHL feedback shared by the Wave 2.1 scheme delivery team.

SHL motivations for applying to Wave 2.1

Interviewed SHLs reported that they were strongly motivated to apply for funding for decarbonisation due to their existing Net Zero and decarbonisation targets. Both successful and unsuccessful applicants said that decarbonisation of their housing stock played a large role in their Net Zero goals. Interviewed SHLs mentioned that scheme's alignment with this wider agenda has created support from senior levels within SHLs that allowed project leads to use resource to develop their bids. This alignment was particularly important for Local Authorities and Combined Authorities, which, as scheme delivery representatives pointed out, tend to be more risk averse than private organisations when undertaking high-cost projects. The alignment of the scheme with their existing goals and support from senior levels reduced the risk of their involvement.

Improving resident comfort was another key motivation to apply to Wave 2.1, particularly emphasised by PRPs. Applicants said the key benefits they sought for residents were: enhancing comfort, warmth, fuel cost reductions, community development, and overall customer satisfaction.

> *"We clearly care about our customers and want the best for them – want their home to be their castle. If we can enhance the comfort, that is a key motivation to reach out for these opportunities on behalf of the residents." Successful SHL*

[13] All findings from 'applicants' reflect views of those interviewed, rather than the full cohort of applicants.
[14] The Technical Assistance Facility Bridge (TAF Bridge) was contracted by DESNZ to the organisation Turner & Townsend.

Another motivation to apply to Wave 2.1 reported by successful applicants was the development and strengthening of supply chains, including those established in previous retrofit work (see 'Engaging the supply chain' section).

In interviews, most unsuccessful applicants said they needed external funding to carry out their own retrofit work at scale, and therefore were motivated to apply to Wave 2.1. They mentioned the high capital costs of the scale of work set out for Wave 2.1, which they would have not been able to complete without funding support. Among successful applicants who commented on this during interviews, three specifically stated that funding increased the scale and shortened the timeframe with which they were able to retrofit homes.

Application process

Interviews with SHLs indicated that enablers in writing Wave 2.1 applications included the scheme design aligning with existing SHL decarbonisation plans, stock data knowledge, retrofit experience and TAF Bridge support.

Enablers to the application process

During interviews, SHLs reported that the design of the Wave 2.1 scheme enabled applications in the following ways:

- As mentioned above, SHLs said that the aims of the Wave 2.1 scheme closely aligned with organisations' existing decarbonisation agendas, which acted as a strong enabler to gathering interest and resource to submit their bids.
- Most applicants who had retrofit experience reported that they had already used the fabric first approach, which further aligned the scheme design to their existing goals.
- Most of the successful and at least half of the unsuccessful applicants said they welcomed the PAS 2035 requirement, and said it allowed them to raise the quality of their retrofits and gain learnings.
- SHLs implied that consortium formation created an opportunity (which as mentioned above was encouraged in Wave 2.1 bids) for less experienced retrofit providers to learn from other consortia members about data collection, PAS 2035, measures, bid and retrofit plan development, and procurement. While some applicants suggested that leading a consortium did produce more bureaucracy and management difficulties for the lead organisation, it was noted that those not leading the consortia benefited from the decreased administrative involvement in the bidding thanks to the lead organisation's support.
- None of the interviewed applicants noted the minimum bid size as a challenge to their plans. Instead, most applicants were eager to scale and expedite their existing plans.
- A few applicants stated that the extended timeframe of delivery of retrofits in the 2.5 years allocated for Wave 2.1 was appreciated.

- Participants indicated that the expansion of applicant type from local authorities only in Wave 1 was welcomed, reducing bureaucratic steps that may have hindered some potential applicants otherwise.
- A few noted the benefit of allowing the stock owners to be responsible for the home improvements rather than the residents, as is the case for several other relevant schemes such as Energy Company Obligation (ECO).

In terms of SHLs' ability to apply, some SHLs reported that previous experience with energy efficiency retrofit projects (such as the Demonstrator, Wave 1, the Local Authority Delivery scheme, the Home Upgrade Grant, or other retrofit works not funded by government) was a strong enabler in applying and feeling prepared to deliver Wave 2.1. SHLs explained that experience with previous retrofit projects provided insights into aspects such as knowledge of delivery plans, close relationship with residents, existing supply chain relationships, familiarity with PAS 2035 as well as preparedness for writing this type of bid.

Stock data preparedness appeared to be a lesser barrier to successfully applying in Wave 2.1 compared to Wave 1. Multiple Wave 2.1 applicants noted that their stock data knowledge was better than at the time of the Wave 1 competition. Several mentioned they had invested in stock data software, with at least two attributing this internal investment to SHDF projects. One unsuccessful applicant felt they were able to demonstrate a greater depth of understanding of their stock and represent more certain costs than they had in Wave 1, due to the use of more recent stock data.

Some applicants said they found the application straightforward, and those participating in Wave 1 noted an improvement to the previous application. At least half of the applicants interviewed stated that the information requested was appropriate, even if some of these still found it burdensome.

Challenges to the application process

Both successful and unsuccessful applicants reported challenges and barriers to applying to Wave 2.1. Challenges that were informed by the design of the scheme itself (mentioned by interviewed applicants) included:

- Strong critiques (by a few successful applicants) of the **administration and ancillary costs as being too low for the amount of work that need to go into the Wave 2.1** project preparation and first stages of delivery. A few unsuccessful and successful applicants interviewed also felt that the overall level of administration was too high for the project.
- Several applicants interviewed saw **the requirement of reaching up to an EPC rating of C on homes with measures installed as a limitation influencing both the selection of homes and measures** (see also the 'Measure mix' section). One unsuccessful applicant explained that 75% of their housing stock already had an EPC rating of C, so this limited their ability to improve much of their stock through Wave 2.1. Two successful SHLs said that they or some of their Registered Providers (RPs) would have preferred to do more works in one project, rather than stop when they achieved an

EPC rating of C and then need to return to these properties later to improve them further. However, another successful SHL said they were using their own funding to improve properties further to an EPC rating of B, so this was not necessarily limiting all plans.

- A few unsuccessful and at least one successful applicant interviewed implied that the **cost caps** (the amount of Wave 2.1 funding available for retrofit per home, according to starting EPC band of the home and wall type of the home) **were too low for the costs of the works, particularly for clean heat measures.**
- Issues identified by applicants about adhering to PAS 2035 requirements were tied into the above points on EPC limits, supply chain readiness, and costs. A few applicants stated **they could do the same work for much lower costs were they not to employ PAS 2035 standards or certified coordinators**. Meeting the PAS 2035 requirement of Trustmark certification had also put a high strain on the available supply chain.
- Some applicants still felt that the **delivery timeframe was a barrier to applications, despite it being longer for Wave 2.1 relative to Wave 1**. Applicants explained that the timeframe was a challenge due to projects facing issues in procuring suitable contractors and at appropriate costs due to a shortage of qualifying contractors and supply chain stakeholders (created by the heightened demand from this and other retrofit programmes). **Some SHLs also felt they could not apply to both Wave 2.1 and Home Upgrade Grant scheme (HUG) simultaneously, given their timelines coincided.**

Issues with the application process itself, suggested by interviewed applicants, included its complexity, the timescales and timing of the bid, data and modelling requirements, and some projects having many consortium members:

- **Technical problems with submitting bid data** (related to difficulties with Excel formatting and converting data into the requisite format) **were a significant source of frustration for applicants.** Applicants reported that error messages appeared even though they were sure all the information was in the correct place, and several noted that they could not resolve the complications through the SHRA support. While most indicated the guidance document was fairly clear, two applicants and one scheme delivery team member noted that there were some interpretation errors that caused the need for clarifications and affected the time to develop accurate bids.
- Though mentioned by fewer SHLs than in Wave 1, **poor stock data was still a significant barrier for at least half of the applicants interviewed** (especially for smaller, less experienced organisations, and those without prior Wave 1 experience). Key issues highlighted were the high resources and costs to conduct the at-risk data assessments prior to securing funding and lack of experience with or readiness for retrieving the detailed and up-to-date data.
    - Several successful and unsuccessful applicants called for greater flexibility in the initial data, as it was expected that full assessments would be conducted and homes and measures finalised once the bid is won.

- Applicants reported that **the need to collect and collate data from multiple RPs amongst consortia bids added complexity and bureaucracy** (even if headed by large organisations well used to these challenges). This was supported by views from the Wave 2.1 scheme delivery team members.
- Three unsuccessful applicants shared strong negative views of the pre-application SHRA support. They reported that they had been marked very low on questions that the SHRA did not provide any feedback on in the critical friend review.

SHRA support for applicants

SHRA support was provided by the TAF Bridge contracted by DESNZ to the organisation Turner & Townsend. A separate case study of the TAF Bridge has been produced alongside this report, which describes in more detail the role of TAF Bridge and methods of support for applicants, ranging from online courses to bespoke one-to-one sessions.

The TAF Bridge support in Wave 2.1 expanded to support all registered providers, as opposed to only those with over 100 properties in Wave 1. In addition, a strategic support manager role was introduced to provide additional high-level support to high-risk or large value projects.

The TAF, via the SHRA support service, supported all successful bids for Wave 2.1, and six out of the seven unsuccessful bids. **Many applicants praised the SHRA support during interviews and the TAF felt there had been strong engagement from projects.**

> *"We had a really positive experience in terms of bidding, we had lots of windows into DESNZ and BEIS. We had really good support from Turner and Townsend which was pretty critical I would say." Successful applicant SHL*

SHLs reported during interviews that the SHRA supported them in a number of ways with their Wave 2.1 bids including:

- Many successful applicants felt that the **SHRA support was very valuable, working with them throughout bid development and receiving feedback on their progress**.
- Where in consortia, applications suggested that most partners attended the webinars and discussions. Two of the successful applicants stated that they were able to form their consortia through SHRA support.
- Interviewees from the scheme delivery team noted strong engagement from some in one-to-one sessions, that they received positive feedback from most on the 'critical friend' review, and noted that **larger bids received more bespoke support.**
- While several SHLs interviewed reported receiving bespoke support from SHRA throughout the bidding process, a few other SHL interviewees (particularly those with more retrofit experience) noted that **some of the support felt more generic**, with more introductory retrofit and planning information.

  "I actually felt that the support received in Wave 1 was more focused on providing a bespoke service to us and answering our needs. And likewise, the feedback

after Wave 1 was more tailored to our bid… The Wave 2 support I felt was quite generic." Unsuccessful applicant SHL

- Scheme delivery representatives reported **extra engagement efforts (in the form of face-to-face meetings with executives) were put in for those organisations with particularly high stock levels to elevate the ambitions of their bids**. It was stated that these senior-level engagements were particularly fruitful in driving up bid sizes between the initial plans to the final applications, with one applicant notably scaling up their bid size by threefold (in £ millions).

Both successful and unsuccessful SHLs often referred to using external consultant support during interviews (including those who accessed SHRA), for writing high-quality bids, collating financial plans and supporting documents, and technical support.

There were a few more strongly critical views of the SHRA support indicated during interviews, largely from unsuccessful applicants. Criticisms included lack of useful information from workshops, SHRA not answering questions on strategy and collation of costs and feedback on their bids being unhelpful. One successful applicant felt that they were being guided in a different direction to what they thought was appropriate for their bid, ultimately reverting to their own plan. One unsuccessful applicant noted that Wave 1 TAF had advised them not to submit a bid in Wave 1 (which they disregarded and were then successful in), which put them off using the service in Wave 2.1.

Appraisal feedback

DESNZ officials felt that the application appraisal process went well. Although resource and time constrained, they felt the process was more rigorous in comparison to Wave 1 and benefited from the greater support from external contractors. Specific strengths highlighted during interviews included:

- **The competition support partner, an external organisation contracted to support DESNZ with the competition process, had provided useful support through additional resource and offering a high level of relevant technical expertise**. One scheme delivery representative also noted that the competition support partner made useful challenges to the processes in place to make these more efficient and helped keep the process to time.
- **Applications were said to be very structured and thereby provided rigour**. This included, for example, questioning whether inflation was factored in costs and the level of engagement with supply chains. This was thought to help provide confidence in costs and the value for money part of the appraisal. **Appraisers were said to have a good understanding of the bids including the risks within these**, the detail as well as in overview, for example, regional distribution.
- Regular moderations of bids were said to have helped the process move along quickly.
- **Criteria leads** were appointed by DESNZ so that appraisers could discuss queries relating to specific criteria to one person with expertise in that area. Among interviewees, **this was thought to raise the quality of appraisals**.

The small number of challenges noted in the application appraisal process by scheme delivery representatives were:

- The frequent moderations meant that decisions on earlier applications were not revised in light of learnings from later applications.
- There was a short timeline for assessing applications. One scheme delivery representative acknowledged that resourcing on SHDF was very lean and so some staff were very busy. There was also a risk that knowledge was concentrated in a few staff at DESNZ and could be lost if they left the team.

Feedback from unsuccessful applicants

All interviewed unsuccessful applicants felt that the **feedback on their applications was very generic**, and it did not clearly explain why they did not pass. No one seemed to agree with the outcome and **several noted that the brief feedback was "unfair."** Critiques were raised on **lack of ability to seek further clarification** (e.g., inability to reconnect with DESNZ or TAF). A few noted specific examples of ways the feedback did not support their preparedness for future waves or clarify the reasoning for not securing the current bid. One feedback stated the applicant did not provide enough detail in their answer, but had used all the word limit. Another commented on an accounting error, but the applicant critiqued that the final amount would not have changed, and thus not being able to communicate further on this with DESNZ was "frustrating".

Quality of bids

The scheme delivery team unanimously stated that the scheme, with SHRA support, was able to bring in a high number of good quality bids. Partway through the process, the target for grant funding was increased. Even with the new targets, there was oversubscription to the scheme, a high scale-up from Wave 1, and large-scale funding successfully awarded.

The use of the SHRA pipeline of potential applicants was highlighted as preparing the scheme delivery team for the project profiles they could expect to see in the applications, including regional spread, scale, scope, and measure type. The delivery team did note that more landlords had taken on more clean heat initiatives (e.g., heat pump offers) in Wave 2.1. However, they suggested the push for clean heat measures could be strengthened further in future calls, for example by shifting from the explicit fabric first approach, expanding EPC eligibility and targets, or providing direct clean heat funding.

One gap noted by the scheme delivery team was that it is not yet clear which segments of the market did not submit applications and why. However, they mentioned that research is being conducted on this and should feed into the design and marketing of future waves. One cohort suggested to focus on less mature organisations for future waves, who may not feel prepared to apply for funding.

Profile of bids

The Wave 2.1 scheme had strong engagement from SHLs and was oversubscribed. Successful bids on average achieved 59% match funding, higher than the minimum of 50%. Housing held by smaller SHLs was less likely to be included in the scheme than housing held by larger SHLs.

Scale of bids and match funding

In total, £777.4 million was awarded to 107 successful Wave 2.1 projects, from a total of 145 applications (74%).[15] Successful bids involved 275 organisations in total (including leads and partner organisations in consortia). The total grant funding represented 97% of the £800 million that was initially allocated to the fund for grants.[16]

Wave 2.1 required greater match funding than at Wave 1 (a 50% minimum rather than 33%). Successful Wave 2.1 grants proposed match funding of £1,127 million (59% of project value), above the minimum of 50%. As intended, this demonstrated an improvement with respect to Wave 1, where projects attracted 50% match funding, when a minimum of 33% was set. As a result, the overall project value of accepted bids for Wave 2.1 was £1,909 million, as shown in Table 3.

Table 3: Value of bids made and accepted in Wave 1 and Wave 2.1

	Bids for grant, combined value (£ million)	Grant, combined value (£ million)	Co-funding, combined value (£ million)	Project value (£ million)	Co-funding (%)
Wave 1	203.6	170.4	180.5	351.0	51%
Wave 2.1	864.6	777.4	1,127.4	1,909.3	59%

Source: Bid data.

Consortia formation

In total, 257 landlords (as well as 17 other organisations in a co-ordinating role) were involved in successful bids as leads or consortium members at Wave 2.1, up from 164 in Wave 1, an increase of 57%. This indicates significant success at bringing new SHLs into the scheme. Some of the interviewed applicants had taken part in Wave 1,[17] which they felt had given them an advantage in bidding, in terms of their own preparedness and knowledge of both retrofit and the bidding process. Scheme delivery staff also stated that they saw these benefits when working with SHLs who had been involved in Wave 1. Looking across all successful bids, 97 of 257 (38%) of the landlords featuring in successful Wave 2.1 bids were involved in Wave 1, and 33 of 104 project leads (32%).

[15] 34 of the 107 successful projects had also received funding through Wave 1.
[16] Social Housing Decarbonisation Fund: Wave 2.1 (closed to applications) - GOV.UK (www.gov.uk)
[17] 4 of 7 successful applicant SHLs (from sample data) and three of 7 unsuccessful applicant SHLs interviewed (from interview questions) had experience of Wave 1.

The proportion of Wave 2.1 funding allocated to bids led by consortia was 52%, down from 69% at Wave 1. While PRPs could lead projects in Wave 2.1, they had to join a project led by a LA to take part in Wave 1. This led to a number of PRPs approaching a LA to bid on their behalf in Wave 1. In these cases, the LA would have limited input to the project. However, these projects were still classified as consortia. This arrangement was much rarer at Wave 2.1.

If these projects were not considered as consortia at either wave, the proportion of consortia projects would still fall from 35% at Wave 1 (24 of 69) to 21% (22 of 107) at Wave 2.1. However, the proportion of funding allocated to consortia would rise slightly from 47% at Wave 1 to 51% at Wave 2.1, indicating an increase in large consortia projects and a reduction in smaller consortia projects.

The award rate for consortia bids at Wave 2.1 was much higher (96%) than for other bids (69%), as shown in Table 4. The award rate for bids defined as consortia at Wave 1[18] was 76%, compared to 73% for other bids (Table 5). Very large consortia make applications 'high stakes', because if an application from a large consortium were unsuccessful, particularly one headed by a Combined Authority and accounting for the bulk of Wave 2.1 installations for an urban region, the reach of the scheme would be greatly reduced in a large and/or populous geographic area.

Table 4: Bids made and accepted by consortia status, Wave 2.1

Consortia status	Bids made	Successful bids	% of bids which were successful	% of successful bids
Consortium	27	26	96%	24%
Single organisation	118	81	69%	76%
Total	**145**	**107**	**74%**	**100%**

Source: Bid data.

[18] It was not possible to exclude LAs without social housing stock bidding together with a single landlord for this analysis because the available bid data for Wave 1 did not detail consortium structures.

Table 5: Bids made and accepted by consortia status, Wave 1

Consortia status	Bids made	Successful bids	% of bids which were successful	% of successful bids
Consortium	46	36	76%	51%
Single organisation	46	33	73%	49%
Total	**92**	**69**	**75%**	**100%**

Source: Bid data.

SHL involvement in Wave 2.1

Comparison against official registers of SHLs,[19] summarised in Table 6, shows that successful Wave 2.1 bids involved (either as a lead or consortium member) 75 Local Authority SHLs that manage social housing units,[20] a total of 57% of the 131 Local Authorities directly managing stock in England.[21] Although they often joined bids led by other Local Authorities or by Combined Authorities, only two Local Authorities or ALMOs (Arms' Length Management Organisations, who manage housing stock on behalf of owning Local Authorities) joined a PRP-led bid as a consortium member rather than a lead. In general, therefore, PRP-led bids did not include council-owned housing.

A total of 14 ALMOs were involved in successful bids (82% of all those in the UK). Nine Local Authorities who do not manage housing stock were involved in successful Wave 2.1 bids, either as partners of ALMOs or project leads.

In total, 164 PRPs (including Housing Associations, Housing Trusts, Housing Co-operatives, and Almshouse Charities) were involved in a successful Wave 2.1 bid, as well as four charities not registered with the Regulator of Social Housing. Nearly all of the largest PRPs in England were involved in a successful Wave 2.1 bid (94% of those with 25,000 or more properties under management in England), although most bids were locally focused and likely involved only a small proportion of the PRPs' stock.

Mid-sized, and particularly smaller PRPs, were less likely to be involved in successful Wave 2.1 bids; only 10% of those with 100 to 999 units of social housing under management, and 2% of those with fewer than 100 units. In interviews, several applicants noted a likely advantage for larger organisations to apply due to internal resource availability to write bids; also, the limited consortia formation observed (while welcomed as an option in qualitative interviews) may have reduced opportunities for small organisations to join Wave 2.1.

[19] The Statistical Data Return and Local Authority Data Return from the Housing Regulator, and the National Federation of ALMOs list of members.
[20] A further nine non-stockholding Local Authorities were involved in a co-ordinating capacity, leading bids.
[21] Many Local Authorities do not hold social housing stock, having transferred it to other social landlords in a Large-Scale Voluntary Transfer (LSVT) arrangement. Stockholding authorities here are defined to exclude those holding small amounts of residual housing after LSVT (less than 100 units).

This indicates that few consortia at Wave 2.1 are successfully bringing in small housing providers in the area in which they operate, in particular Almshouse Charities (only 1% were involved). While this does not meaningfully limit the scale or impact of Wave 2.1, it does mean that a widely dispersed group of properties held by smaller social SHLs will not have measures installed at the end of the scheme.

Table 6: Organisations managing social housing in England involved in Wave 2.1 successful bids

SHL type	Number of social rented properties managed in England	Number involved in Wave 2.1	Number of SHLs in England	% involved in Wave 2.1
Local Authority (managing social housing)	1,365,300	75	131	57%
ALMOs	174,100	14	17	82%
PRP: 25,000+ units	1,400,400	31	33	94%
PRP: 10,000 to 24,999 units	615,900	30	41	73%
PRP: 5,000 to 9,999 units	331,500	30	50	60%
PRP: 1,000 to 4,999 units	196,200	37	76	49%
PRP: 100 to 999 units	80,600	23	237	10%
PRP: <100 units	19,900	13	602	2%

Sources: DESNZ project summary data; Housing Regulator SDR (Statistical Data Return); Housing Regulator LADR (Local Authority Data Return); National Federation of ALMOs

PRPs and unregistered providers were permitted to lead bids for the first time in Wave 2.1. As shown in Table 7, a total of 37 PRPs (36% of project lead organisations) and one unregistered provider did so. Most bids were still led by Local Authorities (58%), including some who were not landlords in their own right, and a small number by Combined Authorities (6%).

Table 7: Types of organisations leading Wave 2.1 successful bids

SHL type	Number involved	Number leading successful bids
Local Authority (stock-holding)	75	49
Local Authority (not stock-holding**)	11	11
Combined Authority	6	6
ALMOs	14	0
PRPs	164	37
Unregistered Providers	4	1
Total	274*	104*

Sources: DESNZ project summary data. *Some organisations led more than one project, and/or were involved in more than one project as partners. **includes those legally holding stock, but which is operated by an ALMO.

Properties planned to receive installations

94,096 properties were planned to be retrofitted by the projects funded by Wave 2.1. Targeted properties consisted of a mix of housing stock, with houses (34% terraced and 31% semi-detached) being most common. The majority of properties to be retrofitted had an EPC rating of D (87%).

Rationale for selection

Many interviewed applicants stated that they had a list of homes that they were looking to improve. Reasons given to select homes included: oldest or least energy efficient homes in the stock (e.g., build in 1920's), continuation of previous retrofit plans (including those who were not eligible for other funding), and homes pre-selected for other retrofit or maintenance work.

> *"They are probably some of the oldest social housing in the borough – pre-1920. Because of their age, they don't perform very well in terms of thermal efficiency and that's why we chose these properties for the scheme." Successful SHL*

Profile of properties planned to receive installations

A total of 94,096 properties were planned to have measures installed by Wave 2.1 projects. These consisted of 93,071 social housing properties, accounting for 2.3% of England's social rented housing stock, and 1,025 other properties receiving installations as infill. On average, 879 properties were planned to have measures installed per project (min=100, max=6,539).

Two thirds of the social housing properties planned to receive installations (65%) were houses, either terraced (34% of all social housing properties) or semi-detached (31%; see Table 8). Compared to housing stock reported for social landlords in the English Housing Survey (EHS),

houses were substantially over-represented among Wave 2.1 properties (65% vs 45%), with flats considerably under-represented, as for Wave 1 (21% in the scheme compared with 44% in the social housing stock). Bungalows were slightly under-represented among Wave 2.1 properties (13% vs 11%), but over-represented among Wave 1 properties.

Table 8: Types of properties planned to have measures installed by Wave 2.1 projects compared to social housing in England

Property type	Number of properties planned to have measures installed under Wave 2.1	% of Wave 2.1 properties which are of this type	Number of social rented properties in England (EHS)	% of social rented properties in England (EHS)
Terraced	31,435	34%	1,099,000	27%
Semi-detached	28,257	31%	741,000	18%
Detached	859	1%	26,000	1%
Bungalow	11,667	13%	459,000	11%
All flats	19,398	21%	1,803,000	44%
Other	126	0%	n/a	n/a
Unknown	1,329	1%	n/a	n/a
Total	**93,071***	**100%**	**4,128,000[22]**	**100%**

Source: Bid data (after successful applications finalised); English Housing Survey 2022-23, Table DA1101. *data not available for 1,025 properties that had measures installed which were not social housing.

At Wave 2.1, as intended, SHLs have targeted energy inefficient properties in bids, as shown in Table 9. Most properties had an EPC rating of D (81,006 or 87% of social housing properties that had measures installed), with a minority having an EPC rating of E (10%) or F (2%). Very few had an EPC rating of G (141, less than 1%).

In terms of absolute numbers, SHLs focused their bids on properties which could more easily be brought to an EPC rating of C.[23]

However, analysis of SHDF and EHS data together indicates that social rented properties in England with an EPC rating of E are the most likely to be targeted by Wave 2.1 (which was also the case at Wave 1). In total, 7.3% of all social rented properties in England with an EPC

[22] Please note the increase in the estimated social rented stock in England (from 3,961,000 in 2021/22 to 4,128,000 in 2022/23) occurred due to methodology changes in the English Housing Survey (the survey did not include empty properties during COVID-19) and was outside our control.
[23] Making the assumption that it is easier to 'move' properties 1 EPC band up the classification than 2 or 3 bands.

rating of D were estimated to be included in initial plans for Wave 2.1, compared to 9.8% of those with a rating of E, and 2.3% of those with a rating of F (mirroring proportions seen at Wave 1). There are few social rented properties with an EPC rating of F or G in England (c. 27,000 in total, i.e., less than 1% of social rented properties in England). It seems that these properties are less likely to be targeted for installation under Wave 2.1, as they were in Wave 1, with only 1,531 (1.6% of the total) planned to have measures installed.

Table 9: Properties planned to have measures installed in Wave 2.1 compared to social housing in England, by original EPC level

	Number of properties to have measure installed by Wave 2.1	% of properties to have measures installed by Wave 2.1	Number of social rented properties in England (EHS)	% of social rented properties in England (EHS)	% of all English social rented properties in this EPC band to have measures installed by Wave 2.1
Band A to C	0	0%	2,900,000	70%	n/a
Band D	81,006	87%	1,106,000	27%	7.3%
Band E	9,205	10%	94,000	2%	9.8%
Band F	1,390	2%	23,000	1%	6.1%
Band G	141	<1%	4,000	0%	3.2%
Unknown	1,329	1%	n/a	n/a	n/a
Total	**93,071***	**100%**	**3,961,000**	**100%**	**2.4%**

Source: Bid Data, English Housing Survey 2020, Table DA7101. *data not available for 1,025 properties that had measures installed, which were not social housing.

The regional distribution of properties planned to have measures installed under Wave 2.1 overall roughly represents the distribution of social housing in England overall. Properties planned to have measures installed are slightly over-represented in the East of England (12%) compared to the distribution of social rented properties across England reported in the EHS data (10%) (as shown in Table 10). This means that a slightly higher proportion of social rented properties are planned to have measures installed in the East of England (2.7%) than average across England (2.3%). On the other hand, properties planned to have measures installed in Yorkshire and the Humber in Wave 2.1 are slightly under-represented compared to social housing as a whole in the region (8% vs 10%), as are those in the West Midlands (9% vs 11%).

Table 10: Properties planned to have measures installed in Wave 2.1 compared to social housing in England, by ONS region

Region	Number of properties to have measures installed by Wave 2.1	% of Wave 2.1 properties in ONS region	Number of social rented properties (EHS)	% of social rented properties in England (EHS)	% of all social rented properties in region to have measures installed by Wave 2.1*
North East	5,285	6%	270,000	7%	2.0%
North West	14,531	15%	582,000	14%	2.5%
Yorkshire and the Humber	7,788	8%	422,000	10%	1.8%
East Midlands	7,461	8%	308,000	7%	2.4%
West Midlands	8,787	9%	461,000	11%	1.9%
East of England	11,539	12%	420,000	10%	2.7%
London	18,219	19%	797,000	19%	2.3%
South East	12,960	14%	531,000	13%	2.4%
South West	7,526	8%	336,000	8%	2.2%
Total	**94,096**	**100%**	**4,128,000**	**100%**	**2.3%**

Source: Bid Data, English Housing Survey 2020, Table DA1101. *Assumes all properties with measures installed are social housing as defined by the English Housing Survey; in fact, a small proportion of those with measures installed will not be, but this gives a close approximation to the true percentage.

Measures planned

At grant funding award, 296,907 measures were planned to be installed across 94,096 properties (an average of 3.2 measures per property), with the most common measure types being Loft Insulation and Ventilation.

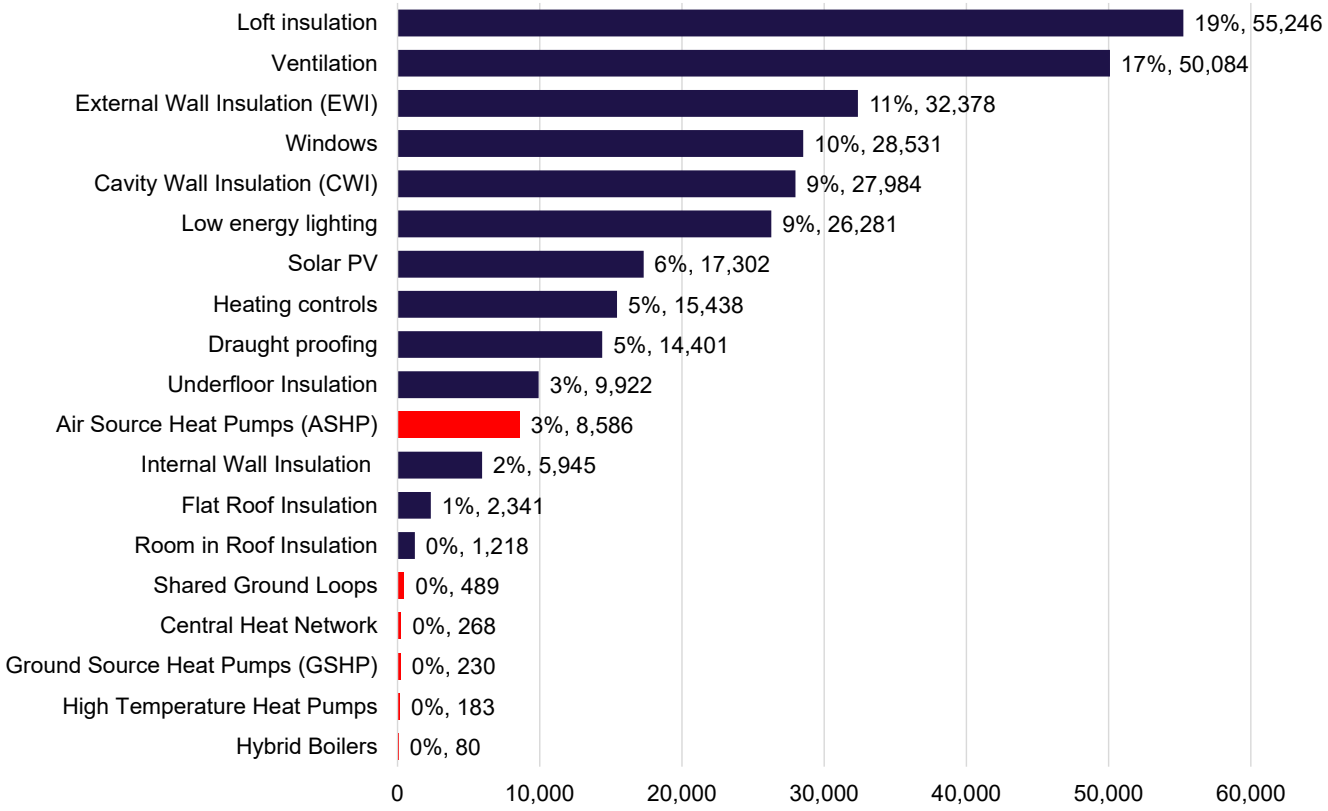
This section explores the range of measures planned to be installed by successful Wave 2.1 projects. Analysis presented within this section draws upon the profile of measures agreed by the end of the bidding process.

Profile of measures proposed at bid stage

In total, 296,907 measures were planned to be installed across the 107 successful projects, according to plans associated with successful bids, an average of 3.2 measures per property.

Figure 1 shows that the most common measures were Loft Insulation and Ventilation, followed by External Wall Insulation (EWI), Windows and Cavity Wall Insulation (CWI). In total, nearly half (45%) of all measures planned to be installed were insulation measures. This was in line with the requirement in Wave 2.1 to focus upon improving fabric first.

Figure 1: Number of measures planned to be installed as part of Wave 2.1 at bid stage. Clean heat measures shown in red.



Source: Bid data, n=296,907 measures, 107 projects. Measures shown in red are clean heat measures.

Planned delivery of clean heat

Clean heat measures were relatively uncommon among Wave 2.1 projects, accounting for only 3% of the total number of measures planned to be installed (9,836 measures), compared to 4% at Wave 1. Clean heat measures were planned to be installed in 10% of properties included in Wave 2.1 overall.

Clean heat measures were planned to be delivered by 51 out of 107 Wave 2.1 projects (48% of projects, compared to 32% at Wave 1). Almost all of these were large projects with an average size of 1,215 properties planned to receive installations, as opposed to 879 for projects overall.

Total spending on clean heat measures was planned to be £137.2 million (£13,954 per measure), or 10% of total spending on measures, twice that found at Wave 1 (5%).

Of total planned clean heat installations, Air Source Heat Pumps (ASHPs) accounted for the highest number of planned measures (8,586, 87% of clean heat measures, or 3% of all measures). This analysis does not include Solar PV (17,302, or 6% of all measures) which can be used to generate heat through its ability to produce electricity.

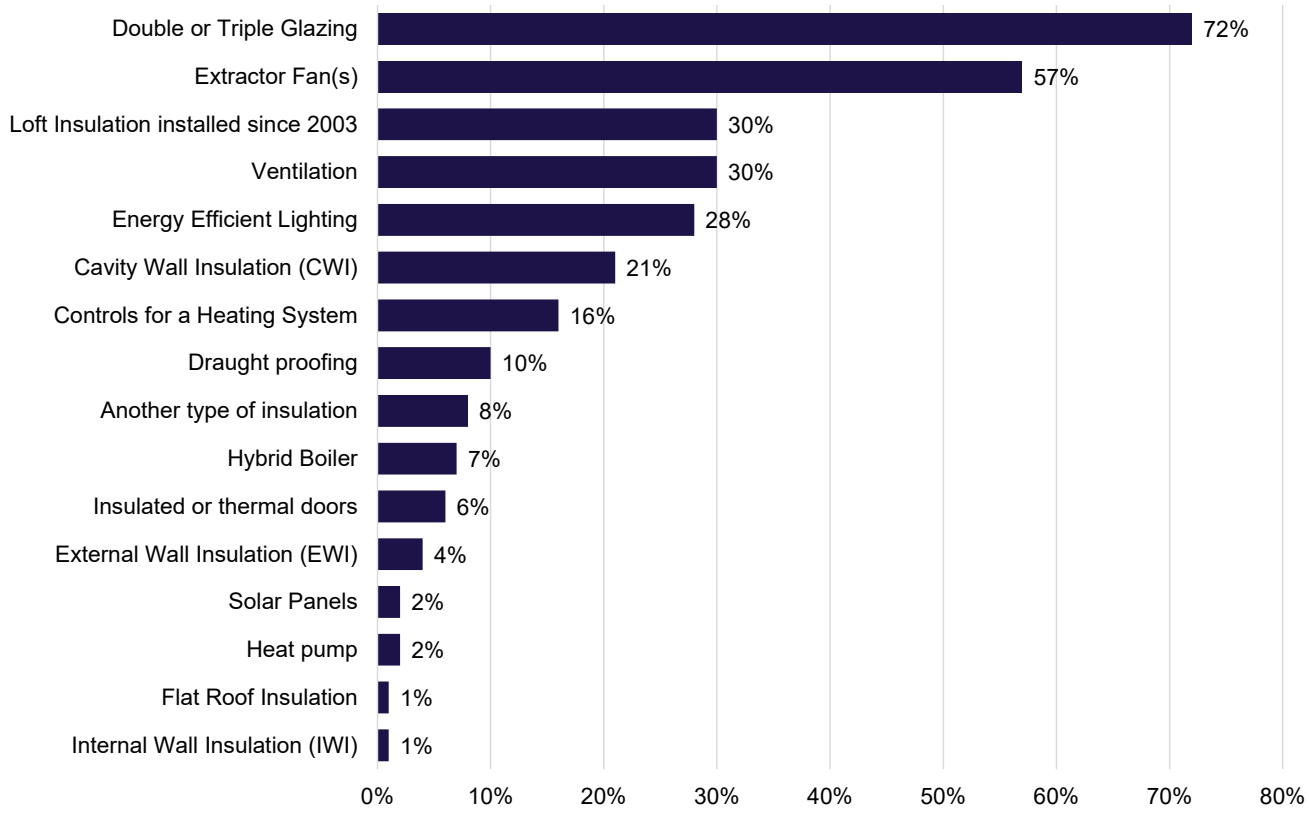
All except two projects[24] that planned to install clean heat measures also planned to install an equal or higher number of auxiliary measures than clean heat measures, suggesting they were planning to insulate homes receiving clean heat measures, therefore following a 'fabric first' approach.

Targeting of measures

In the resident survey, 88% stated they already had at least one of the measures eligible for installation under the scheme installed in their home prior to participating in the scheme (see Figure 2, n=1,867). Seven in 10 residents (72%) already had Double or Triple Glazing, six in ten had an extractor fan (57%) and 30% had had Loft Insulation installed since 2003 or a ventilation measure. Just over a fifth of residents' homes[25] (21%) were fitted with CWI, which has been standard in new homes for many years, indicating that many of the residents in the survey were living in poorly insulated homes.

[24] One project was carrying out a Shared Ground Loop installation, and proposed no supporting measures in their bid; the other proposed a mixture of Heat Pumps and Solar Panels, and proposed a limited number of insulation measures in their bid.
[25] Those without CWI would include homes without cavity walls.

Figure 2: Energy saving measures that were already installed in residents' homes before Wave 2.1 installations started



Source: Wave 2.1 Resident Survey. Question C4merge: Do you currently or did you already have any of the following installed? (Pre-installation) (n=1,867). Note 'Hybrid Boiler' (7%) is likely to include some incorrect responses, due to confusion with combi boilers, despite inclusion of explanatory text in the survey.

Low carbon heating systems were rare in homes prior to installation of Wave 2.1 measures, with only 2% of residents already having had a heat pump installed in their homes.

Measure mix

The requirement of homes with measures installed to reach an EPC rating of C was suggested as one of the key considerations for SHLs when deciding what measures to install. One consortium lead reported that some of their Registered Providers (RPs) were initially considering installing EWI in their properties but had changed their approach to lower cost measures such as new windows and doors, to reach an EPC rating of C (and not above) in line with Wave 2.1 requirements. This may reflect experiences at Wave 1, where average delivery costs for EWI were 25% higher than expected at the outset of the scheme. Another successful SHL noted that they had reduced installations of EWI (and replaced some with CWI) because of cost and the need to release funds to install other measures required to meet an EPC rating of C. This SHL also said they were including some solar PV and electric heating to ensure an EPC rating of C was met.

Evidence showed that planned measure mixes often changed after funding was awarded. One scheme delivery team member noted that projects included fewer of some measures (e.g., insulations), but more of others, like double-glazing, compared to their initial business case modelling. Changes to measures were made due to updated information gathered from retrofit

assessments as well as the desire to take a whole-house approach to work (aligning other works required in homes with Wave 2.1 installations to avoid overburdening residents with future works, and also enable efficiencies and economies of scale).

Several successful and unsuccessful applicants interviewed stated that measures were only finalised once the retrofit dwelling assessments were completed at the start of the project. They stressed that, while models were run to get an idea of the measures needed, these could not be confirmed until the retrofit team was on site. This was particularly prominent among consortia leads, as many of the RPs would be responsible for confirming their respective and varying measures.

> *"We take a very whole-systems approach, we're not fixated on a single tech type – we're agnostic. Because of that, we are not going to pre-empt what a retrofit assessment will say. We can model, but we won't get the full answer till you walk through the door. So, we remained open in our scope, and we were led by what the partners informed us who have got the knowledge of their properties."*
> *Consortium lead*

One successful SHL interviewed said they used a software package to produce a scenario for measures to be installed, as well as their internal experience to make some adjustments. For example, they found that triple glazing can cause maintenance difficulties because the hinges do not seem to last well, so preferred to avoid this.

The suitability and cost of fabric-first measures, insufficient understanding of clean heat measures amongst SHLs, as well as cost caps, informed why clean heat measures were relatively uncommon among Wave 2.1 projects (see 'Planned delivery of clean heat' section). For SHLs interviewed who were not installing clean heat measures:

- Two successful applicants mentioned that they would need to build more understanding of these measures amongst themselves before attempting to install them.
- One specified that more assessments (such as on ventilation, day-to-day living) are needed to understand and justify if their stock is ready for clean heat, as well as consideration for the post-installation monitoring of these.
- One noted that they see the fabric-first approach as the right one for their stock and are not ready to switch from their largely-gas-based system to electric heating.
- Another SHL also noted that they would only consider installing clean heat in properties with electric heating, and not in properties which originally had a gas boiler.

Scheme delivery representatives noted that the cost of the fabric first measures alone are very high, and thus many applicants could not afford to also include clean heat options in their projects. Supporting this, one unsuccessful applicant explained that the cost caps were too low for them to install GSHPs, despite having looked at the feasibility of installation. This applicant did have prior experience with ASHPs but would have needed GSHPs for their Wave 2.1 stock archetype. One scheme delivery representative also noted that properties may reach an EPC rating of C through fabric measures alone, which then meant there was no financial incentive to include clean heat within the Wave 2.1 project.

Additionality

Interviewees strongly suggested Wave 2.1 funding provoked significant additional installation activity, as found in Wave 1.

Whilst both successful and unsuccessful Wave 2.1 applicants suggested that their organisation would generally be undertaking retrofit without Wave 2.1 funding in some way, evidence suggests that Wave 2.1 funding added to the retrofit undertaken in a range of ways.

> *"I think it's fair to say [that] the large majority of the work would not have happened in the timeframes set out. The grant funding has enabled the Registered Providers to accelerate and go deeper than they would have done. [Registered Providers] would have reverted back to their annual maintenance programmes, which would have possibly seen like-for-like assets installed as opposed to low carbon heating systems in an accelerated fashion. We would not have seen the scale we're seeing now… it would have been delayed." SHL (successful applicant)*

During interviews, applicants often stated that Wave 2.1 funding had resulted in additional retrofit activity:

- One said some of the smaller registered providers in their consortium would not have been able to undertake retrofit at all without Wave 2.1 funding.
- Some successful applicants noted that they would probably not have undertaken the same scale of works without Wave 2.1 funding, for example, adding 500 EWI installations.
- Some successful applicants reported that Wave 2.1 aligned with their organisation's retrofit plans, but funding accelerated these.

  "In addition to our other programmes, this is the leading opportunity for a form of delivery against those objectives of how to scale up, drive best practice, and drive the supply chain investment to meet the growing demands. There was a really strong overlap between the policy goals of SHDF and the founding principles of the [applicant cohort]." Successful SHL

Some unsuccessful applicants said that their plans would now be undertaken at a slower pace without the funding, resulting in substantial delays, for example over 4 years rather than 2.

Less commonly, unsuccessful applicants said they were installing without meeting PAS 2035 standards, as a way of reducing costs in order to progress work without a grant, suggesting Wave 2.1 funding has contributed not just to a greater scale of retrofit, but also improved quality of retrofits than would otherwise be the case.

However, one successful applicant did consider that the way in which the scheme operated might have affected volumes of retrofit, noting that compliance requirements in terms of PAS 2035 and scheme reporting had a negative impact upon what they were able to do:

> *"I don't know how many homes we'd be able to retrofit with our contractors without PAS 2035, and all of the levels of reporting and data for grant funding. I don't know whether we'd be able to do more... It's unrealistic to say we'd be doing more without the Wave [2.1 funding], but it doesn't always feel like it, because there is a lot of compliance to get through." SHL (successful applicant)*

One unsuccessful applicant mentioned having found alternative funding from other sources to continue their plans, and others were seeking this (e.g., ECO).

4 Delivery

This chapter explores the delivery of Wave 2.1 projects,[26] looking at overall project progress, providing context in terms of views on scheme and project management. The profile of delivery in terms of measures and properties is then explored, followed by a discussion of risks and costs. The chapter draws on a range of data sources, in particular monitoring data gathered by projects and shared with DESNZ, and also interviews with SHLs leading successful bids, supply chain and scheme delivery stakeholders.

Project progress

Projects have in general successfully established teams and completed basic procurement activity, but practical installation activities remain subject to delay for a significant proportion of projects.

The implementation phase for Wave 2.1 projects commenced in April 2023, and their progress since then has been monitored by DESNZ through a series of milestones:

- MS1: Project team established
- MS2: Procurement activity completed
- MS3: Resident engaged and signed up to works
- MS4: PAS 2035 Risk Assessment Stage completed
- MS5: PAS 2035 Dwelling Assessment Stage completed
- MS6: Design and co-ordination stage completed
- MS7: Installation Stage started
- MS8: Installation Stage completed
- MS9: Handover and data lodgement completed

The cumulative percentage of projects reporting that they reached project milestones between April 2023 and July 2024 is shown in Figure 3. As of July 2024, no project had completed MS8 (installation stage completed) or MS9 (handover and data lodgement completed). However, all projects that submitted monitoring data[27] had completed MS1 as of July 2024 (i.e. to have a project team established) and nearly all (92%, 88 of 96 projects submitting valid milestone data) had completed MS2 (i.e. procurement of supply chain). About half of projects had

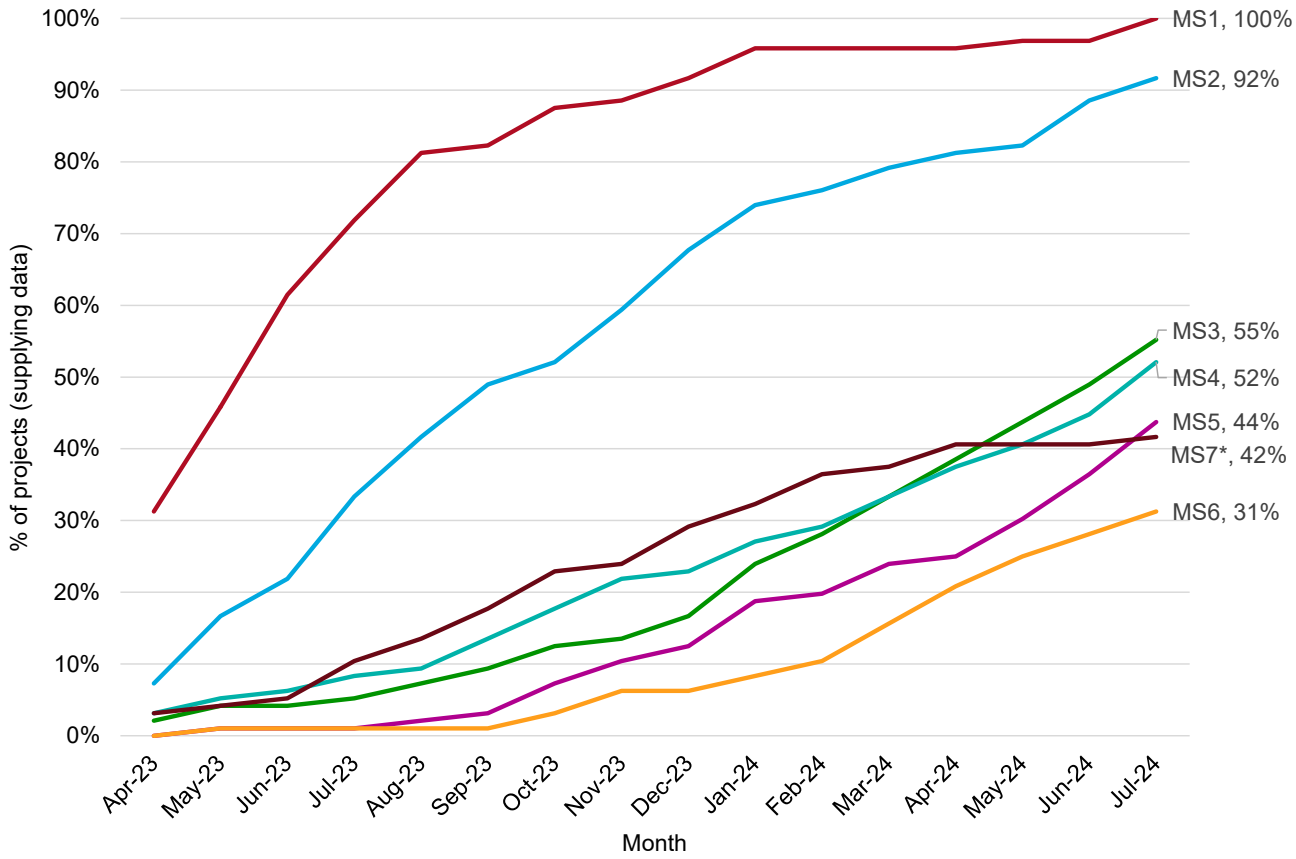
[26] Evaluation questions covered at least in part by this chapter are 1.5, 1.6, 1.7, 1.8, 1.11, 2.1, 2.2, 2.3, 2.4, 2.5, 3.2, 4.2, 4.3, 4.5, 4.8, 5.2, 7.1 and 8.3.

[27] Six active projects did not report valid monitoring data. Five gave dates in the distant past for most milestones despite reporting little project progress in the narrative reporting (provided in a free text format) included within the monitoring data, and one gave dates in the future despite reporting the project was well underway.

completed MS3 (i.e. residents engaged and signed up to works, 55%) and MS4 (i.e. PAS 2035 risk assessment completed, 52%) as of July 2024.

Just under half of projects (42%) had reported starting installations by July 2024 (i.e. MS7).[28]

Figure 3: Milestones achieved by Wave 2.1 projects between April 2023 and July 2024



Source: Project Summary data, July 2024. Base: 96 projects. * Corrected using delivery data; shows delivery started if either source indicates this is the case. Excludes two projects incorrectly logged as cancelled.

There was little if any variation by project size (in terms of number of properties planned to receive installations), region, consortium status or type of lead organisation in terms of projects reporting to have started works.

Scheme management

While the three teams or organisations involved in scheme management and delivery (Integrated Delivery Team at DESNZ (IDT), the Delivery Agent (DA, Salix), and the Delivery

[28] Only 11% of projects reported installations starting through the milestone reporting system, with many reporting dates well into the future for this milestone, despite accompanying text reporting installation activities. This data was therefore triangulated on an individual project basis with delivery data for individual properties, and those logging installations added to the data for the relevant month. This was spot-checked against text-based progress reports and found to be a more accurate approach, but will still be subject to a degree of under-reporting affecting approximately the last 4 months – see the discussion on the data on individual property and measure completions around Figure 4 and Figure 6 for more details.

Partner (DP))[29] were consulted separately, some participant concerns about anonymity mean that we could not specify which teams reported certain findings. 'Scheme delivery' staff or stakeholders are therefore referred to throughout the report, to cover all of these respondents. The report states where there were differing views between teams.

Interviews and a focus group with staff from DESNZ and the DA were held in June and July 2023, and a focus group with the DP was held in September 2023. Thus, scheme delivery stakeholders were consulted very early in the delivery of Wave 2.1, particularly given there were delays to the mobilisation of the DA and DP. **Findings from these groups therefore only apply to the very early stages of delivery.** Whilst later data from SHLs is included on their experience of scheme management, this only covers the experience of a small sample of six projects.

Many issues around scheme management are attributed by interviewees to initial delays in the mobilisation of the DA and DP. Project monitoring was generally considered successful in terms of risks and contractual changes, but less so in terms of monitoring progress in delivery, with many projects not submitting delivery data on time and finding it onerous.

Contracting and mobilisation of the Delivery Agent (DA)

All scheme delivery team stakeholders reported issues with the mobilisation and contracting of the DA, which was a new role providing a layer of oversight between DESNZ and the DP. The DA role was combined with the same role for HUG 2, and the need to jointly design the role across schemes led to complications and delay, ultimately taking between 6 and 9 months, which was longer than planned.

Moreover, due to the need to allocate funding within the financial year, the application window for Wave 2.1 projects opened in September 2022 before the DA was contracted and the paperwork agreed, and therefore without DA support.

Some scheme delivery stakeholders commented that the role of the DA was still not clear to all scheme delivery team members after commissioning. For example, one stakeholder noted that there were some aspects of the role in terms of communications and relationships between parties which were not clear.

Once commissioned, there were some challenges faced in identifying and recruiting suitable individuals. This process was reported by some scheme delivery stakeholders to have taken longer than expected, and this required creativity in pulling together resources and focusing on people with strengths in certain areas. Scheme delivery stakeholders also reported that the delay in appointing permanent teams resulted in the need for knowledge transfer between interim and permanent staff, leading to further delay.

[29] The Delivery Agent (DA) provides strategic oversight including overall performance, DP contract management and lessons learnt management. The Delivery Partner (DP) provides one-to-one project support and assurance, monitors and reports on progress including change control and fraud checks. The DP is delivered by a consortium including Arup, Turner & Townsend and PwC.

As a result of delays, scheme delivery stakeholders reported that DESNZ had to spend time transferring knowledge and supporting the DA and DP during early stages of delivery, and some stakeholders felt under-resourced to deal with this additional challenge. Some interviewees commented that it has sometimes been a challenge for IDT staff to 'let go' of their previous, more 'hands-on' role in directly managing the DP (both at Wave 1 and initially at Wave 2.1) and let the DA do this for themselves.

Following this, scheme delivery stakeholders reported that the appointed DA was able to build on their previous experience acting as a DP for the PSDS (Public Sector Decarbonisation Scheme) to set up their working model with regards to resourcing, ratios between staff and projects, and interaction with the IDT. The teams have had to adjust to new ways of working together. Stakeholders noted it was too early to judge whether the DA were fulfilling their role at the time of interviews. However, there were expectations of future benefits.

Contracting and mobilisation of the Delivery Partner (DP)

The delays in designing and mobilising the DA led to delays in appointing a DP, and compressed the time available for the design of that role. The initial DP tender was based on the DP role in Wave 1, with amendments to account for the DA role. The initial tender was reported to have underestimated the number of Wave 2.1 projects that would require ongoing engagement and monitoring. A scheme delivery stakeholder reported that this resulted in contract variations with the DP, taking up time and impacting planning and resourcing at the DP. Some scheme delivery stakeholders reported that this caused tensions within the scheme.

Due to this delay, some scheme delivery staff highlighted that the DP needed to begin operational work more quickly than originally planned, relative to the time at which their role was confirmed. Scheme delivery stakeholders and SHLs noted that the DESNZ IDT initially stepped in to support the DP role. Multiple scheme delivery stakeholders felt it would have been more efficient if roles and responsibilities had been clearer from the outset, so the DP would have required less additional support and resource from the IDT.

Scheme delivery stakeholders discussed that it has taken a while for the different groups to understand their roles fully, due to the new DA role and amended DP role, and it has been a learning curve.

Despite these challenges, in interviews that took place during the very early stages of scheme delivery, the DP received positive feedback from some scheme delivery stakeholders and grant recipients. Scheme delivery stakeholders reported that, although the Customer Relationship Management (CRM) system, the software for managing data regarding the relationship between the DP and SHLs, was not in place when anticipated, the DA and DP had collaborated well on its development. The DP's experience in retrofit was reported by some stakeholders to make them well-informed and able to establish relationships quickly with grant recipients. Respondents therefore felt that the DP had the potential to fulfil this role.

Further interviews will take place at a later stage of scheme delivery to better understand the performance of the DA and DP after mobilisation.

Project monitoring and management

The establishment of project monitoring processes was delayed as a result of the issues with DA and DP mobilisation. These delays required more input from the IDT than intended.

Projects are required to inform DESNZ of their plans in detail for each property on a monthly basis. However, stakeholders from scheme delivery teams reported that it has been difficult to get robust monthly reporting data in practice. Opinions among scheme delivery teams differed regarding this: one respondent felt that this was also a consequence of mobilisation delays, while another blamed a lack of understanding among grant recipients, and a different respondent felt resource constraints and commitment from the grant recipients was the dominant problem.

Most of the SHLs interviewed felt that compliance with the monitoring requirements required considerable resource, with one reporting that the burden of gathering this data caused delays and impacted their project delivery timescales. The majority of SHLs interviewed also highlighted challenges with using the project monitoring form, with some stating that the pre-set formatting made it difficult to edit the document.

> *"In my opinion, I don't think [DESNZ] really understand how much goes into even just gathering that information and how much resource and time that takes." SHL*

However, a few SHLs reported that, despite the difficulties they experienced, they understood why these information requirements were in place. One SHL noted that they found their Single Point of Contact (SPoC) useful in helping them stay on track with monitoring requirements. Another reported that they have a new data analyst on their team that has enabled them to set up good internal processes to collect, validate and format the monthly monitoring data.

Change control

After Wave 2.1 projects started, issues often arose which required a change of plans in terms of the scale or type of delivery. These requests from projects were recorded via a change control register, and were assessed by DESNZ, Salix or the DP.

Some SHLs reported that they experienced difficulties getting change control requests approved by DESNZ, which ultimately caused delays to project timelines. One SHL said they experienced considerable difficulties in communicating the reason for their proposed changes to their original project proposal to DESNZ. This meant they had difficulties getting this change request approved, but noted that the DP was helpful in this process.

> *"[The* DP*] helped us with that and we were able to get the change request approved. And prior to that, there was someone from Arup who was helping us with a change request and our reporting. So, we have a lot of support on that from them when it comes to reporting and change requests." SHL*

Support from the Delivery Partner

The SHDF and HUG business cases outline requirements for the services provided by the Delivery Partner, which include:

- Regular day-to-day engagement with SHLs.
- Monitoring the performance of SHLs against their project objectives.
- Providing intervention and support to underperforming SHLs, including producing remediation plans.

Most of the interviewed SHLs agreed that the DP was meeting with them regularly. However, feedback varied on whether the DP was helping them to achieve their project objectives, or providing the support required for their projects. Some of the SHLs interviewed reported that their SPoCs had been useful and had helped them progress their projects. Another SHL reported that they believed they received adequate support from the DP. One SHL reported that when a project partner of theirs had requested to meet with the DP directly, the DP was supportive and facilitated this.

> *“We wanted to give that particular partner the opportunity to make sure they communicated what they wanted to communicate properly. So they felt that they were heard […] and not relying on us as a middleman to do that. […] The DP was more than happy to engage with us on that.” SHL*

As for Wave 1, some SHLs have continued to experience issues with support from the DP, particularly around a lack of knowledge and experience, and understanding around the challenges faced when completing installations.

> *"There were some technical questions I asked them about a smart thermostat that I wanted to install before I did my work, so that I could measure the before and afterwards, because we can get that data out of it. But it buys you SAP points. [I was wondering] Can I ignore those SAP points so that I can get on with my projects? I submitted that [query] and waited months for an answer. And the answer I got back was not the question I'd asked at all. So now I've just chosen not to install the switches thermostats in this project although there was loads of valuable data we could have got out of that." SHL*

Additional support used by SHLs

Several SHLs reported not having used any additional sources of support aside from that provided through the scheme, for example through the DP and TAF. One SHL reported that, because they had invested heavily in training and upskilling their internal team, they have been relying less on external sources of expertise than for other retrofit schemes. They believe this has been a key success factor for them.

Another SHL reported that they met as a group with other housing providers working on retrofit to share experiences, the types of measures they are installing and any successes or lessons learned that they identified in the process. They have found this a useful source of support.

> *"We're a member of [a group for housing providers], which we attend, which is a group of housing providers up and down the country who are going through retrofit. It's a monthly drop in session, so there's no agenda, but it's an opportunity to go and discuss things that have been barriers, things that you've come across since the last meeting. […] Those meetings have been useful." SHL*

Properties receiving installations

This section explores the volume of properties that received measures as of the end of July 2024, compared to latest project plans and plans at bid award stage. This section also explores the distribution of projects receiving installations across property type, EPC rating, and region.

Overall volume of delivery

According to project plans as of the end of July 2024, projects had installed, or planned to install, measures in 87,811 properties by the end of the scheme. So far, 13,926 measures[30] have been installed in 6,519 properties (14% of early projections[31]). Slow progress may partly be due to late reporting from projects, but the gap between delivery and projections remains large.

At bid stage, 94,096 properties across 107 projects were planned to receive measures. In the latest project plans as of the end of July 2024, 87,811 properties had received, or were planned to receive, installations. This represents 6,285 (7%) fewer properties receiving or planned to receive installations than originally intended at bid stage.[32] This compares to a much larger descoping of 18% at Wave 1 by the end of the scheme, although at Wave 2.1 further descoping can still occur since many projects have yet to start installations. In interviews, SHLs attributed their changes in project plans to a variety of reasons. For example, two flagged project delays as the main reason, with one being 6 to 8 weeks behind after not accounting enough time for retrofit assessments at the design stage, whilst another faced delays with getting subcontractors onboard. More information on reasons for project descoping can be found in the 'Barriers to delivery and mitigations' section.

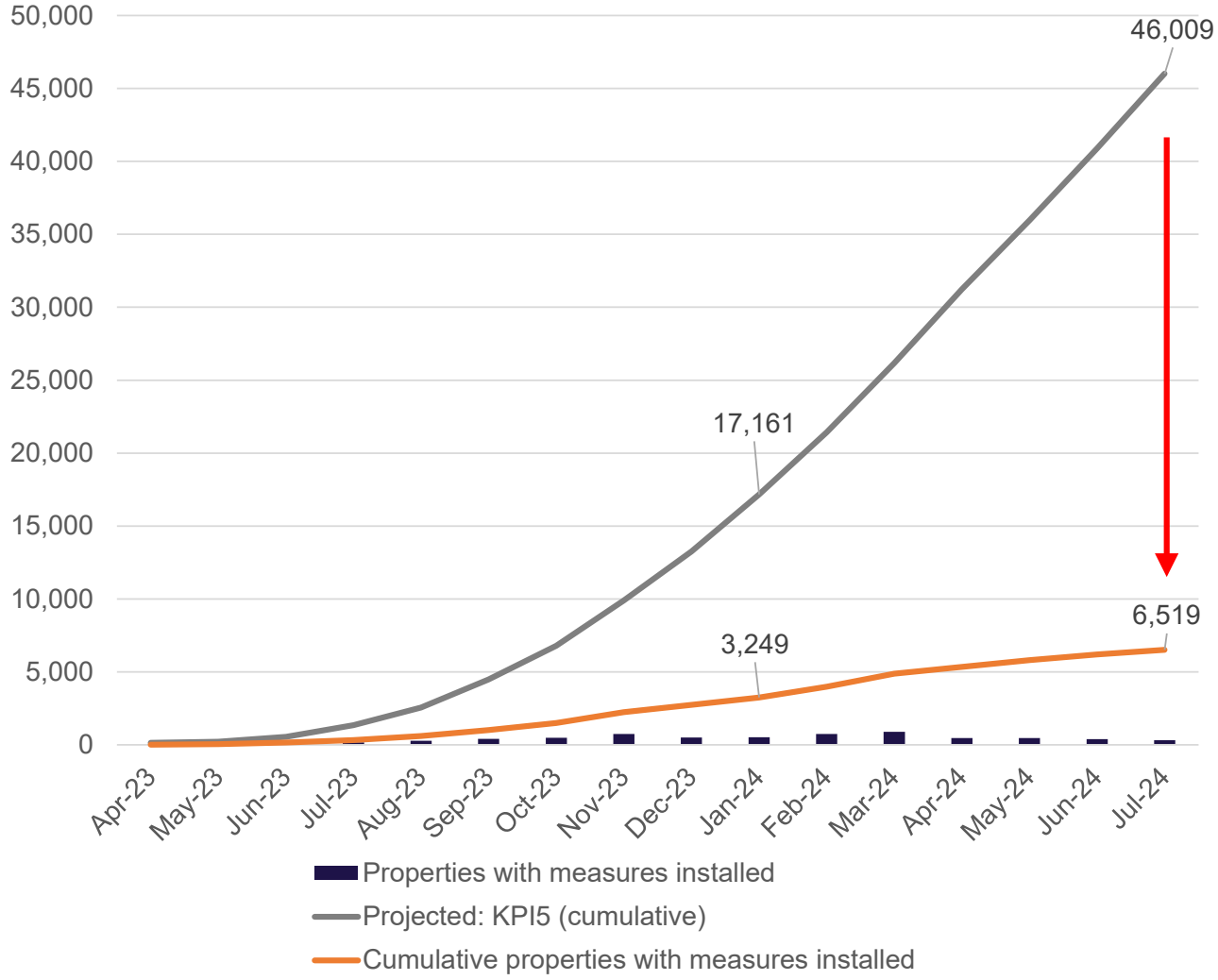
Delivery over time

As of the end of July 2024, 6,519 properties had received at least one of the measures planned for those properties (7% of all properties planned to receive installations).

[30] Including ventilation measures, excluded from totals in official statistics publications.
[31] Taken from August 2023, once all projects had provided projections. Projections since then have been updated by projects to reflect new plans and timings, and therefore comparisons against these earlier projections have been used here.
[32] Three projects dropped out early in the scheme, contributing to the reduction in properties planned to be retrofitted.

Comparing recent property completions with projections outlined in baseline data from early stages[33] shows that delivery is significantly behind (see Figure 4). The baseline KPI5 projection[34] indicated that, by the end of July 2024, 46,009 properties would have been completed. However, only 6,519 were reported as having one or more measures completed in official statistics at the end of July 2024 (14% of properties planned to be completed by this stage[35]). Whilst a portion of this is likely to be due to late reporting from projects, it is unlikely to explain the entirety of the shortfall.

Figure 4: Number of properties with measures installed in Wave 2.1 to end July 2024 compared to baseline projections of completed properties (as of August 2023)



Source: Bid data; DESNZ scheme statistics, accessed at: Social Housing Decarbonisation Fund statistics - GOV.UK (www.gov.uk)., up to end July 2024. Excludes ventilation.

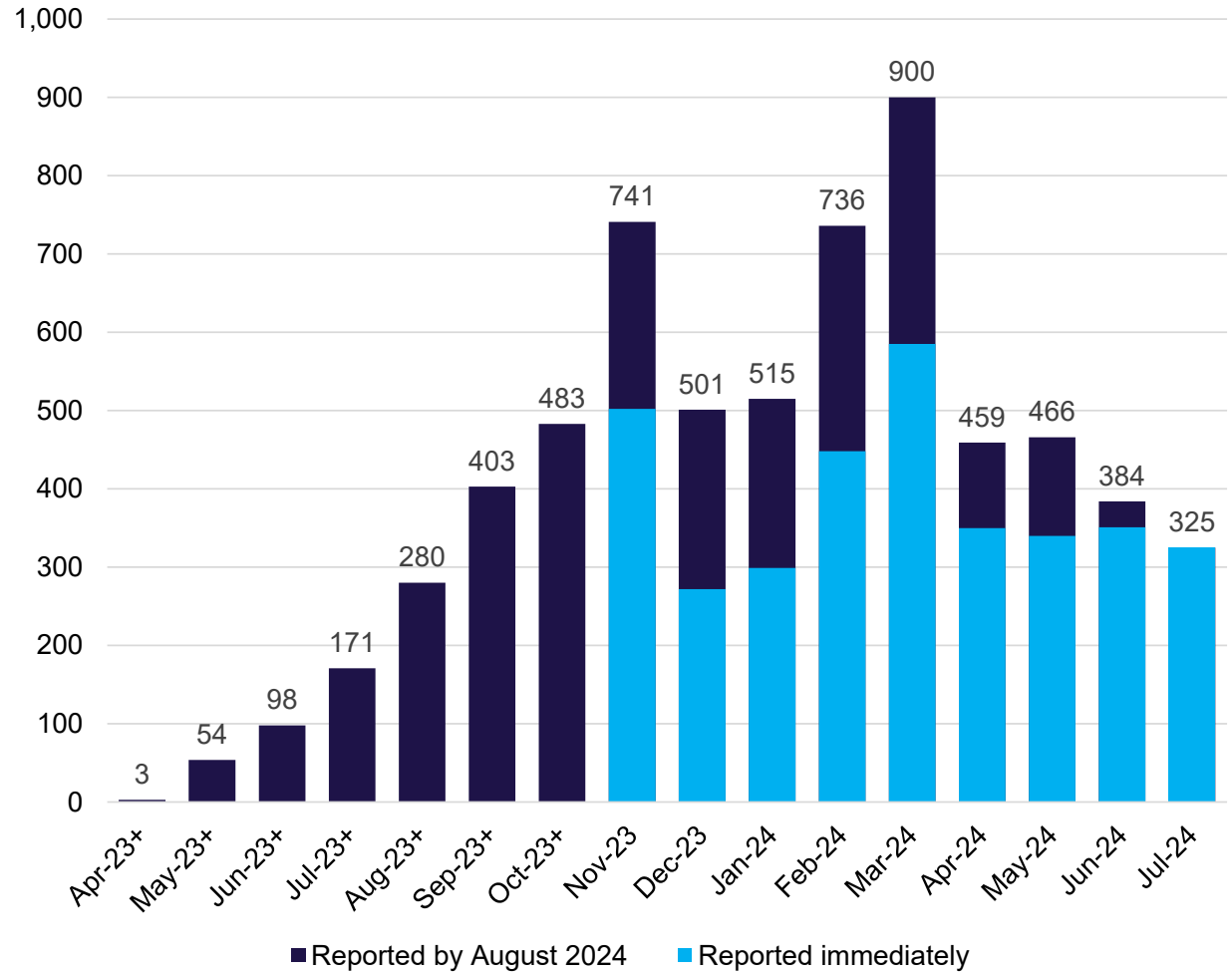
[33] This is taken from the first projection data supplied to the evaluation, for August 2023. This is six months into the projects (which started in March 2023), allowing projects some time to plan the month-by-month timeline of delivery, which would not have been planned in detail at bid stage.
[34] Taken from August 2023, once all projects had provided projections. Projections since then have been updated by projects to reflect new plans and timings, and therefore comparisons against these earlier projections have been used here.
[35] While KPI5 refers to properties with all measures installed, official scheme statistics refer to properties with one or more measures installed (where grant recipients provided an installation date, which is optional and therefore often not reported). As a result, data from official scheme statistics is incomplete.

As shown in Figure 5, March 2024 (at the end of the 2023/2024 financial year) saw the most properties with measures installed, with 14% of delivery being completed in this month. In terms of yearly quarters, January to March 2024 was the busiest, with 33% of current delivery being completed in this period.

It is likely that recent delivery is significantly under-reported. The variation in bar colour in Figure 5 helps to illustrate this issue. Installations reported on time to DESNZ are shown in lighter blue; these appeared in the first official statistics released regarding delivery in that month. The figures shown above the bars are the official statistics released most recently; the dark blue bars illustrate the difference.

As can be seen, although there appears to be a drop-off in provision since March 2024, a substantial proportion of installations in earlier months are reported late (shown in dark blue). The size of these dark blue bars are expected to increase from approximately April 2024 onwards as further data is submitted by projects over the coming months.

Figure 5: Properties with one or more measures installed by month under Wave 2.1, as of end July 2024



Source: DESNZ scheme statistics, accessed at: Social Housing Decarbonisation Fund statistics - GOV.UK (www.gov.uk). Excludes ventilation measures. +First data reporting for Wave 2.1 in DESNZ scheme statistics was in January 2024, so these completions could not be reported immediately.

Distribution of properties

The most recent delivery data[36] shows that houses were the most common property type to receive installations, accounting for 72% of the total (n=70,985 properties). This is followed by bungalows (19%) and flats (10%). Progress relative to plans is shown in Table 11, and indicates that installation progress has been slower with flats than houses or bungalows.

Table 11: Properties planned to have measures installed under Wave 2.1 by property type, at bid stage vs reported delivery data as of end July 2024[37]

Property type	Number of properties planned to have measures installed at bid stage	% of properties planned to have measures installed at bid stage	Number of properties with all measures installed by end of July 2024	% of properties with all measures installed by end of July 2024	% progress at end July 2024 vs plans at bid stage
Bungalow	8,323	12%	1,162	19%	14%
Flat	15,145	21%	587	10%	4%
House	47,517	67%	4,418	72%	9%
Total	**70,985**	**100%**	**6,167**	**100%**	**9%**

Source: Bid data, n=70,985 properties; Delivery data, up to end July 2024, n=6,167 properties. Progress against latest project plans (Change Control data) is not possible since this source does not contain a breakdown of properties by type. Official statistics are not available for this breakdown.

Prior to receiving installations, DESNZ scheme statistics indicate that just 160 properties receiving measures (2%) had an EPC rating of A to C, as shown in Table 12. Post-installation, this had risen to 3,124 properties (48% of the total, but 99% of properties where a post installation EPC rating is known), demonstrating a substantial improvement in EPC rating as a result of the measures. Very few properties (37 so far) were left with an EPC rating of D or lower after measures had been installed.

[36] Official statistics are not available for this breakdown.
[37] Comparisons by property type are made between bids and current delivery data due to property type not being specified within the change control submissions.

Table 12: Pre- and post-installation EPC ratings of properties with measures installed as of end July 2024

Property EPC rating	Number of properties before having measures installed	% of properties before having measures installed	Number of properties after having measures installed as of end July 2024	% of properties after having measures installed as of end July 2024	Change in properties with measures installed vs prior to measures installed
A	0	*%	101	2%	+101
B	0	*%	882	14%	+882
C	160	2%	2,141	33%	+1,981
D	5,523	85%	37	1%	−5,486
E	519	8%	0	*%	−519
F	86	1%	0	* %	−86
G	31	<1%	0	*%	−31
Unknown	200	3%	3,358	52%	+3,158
Total	6,519	100%	6,519	100%	N/A

Source: Source: DESNZ scheme statistics, accessed at: Social Housing Decarbonisation Fund statistics - GOV.UK (www.gov.uk), up to the end of July 2024. Excludes ventilation measures.

As shown in Table 13, as of the end of July 2024, in their latest project plans projects collectively planned to install measures across all regions of England, with the largest proportion in London (18%) (n=87,811 properties). As of July 2024, projects in Yorkshire and the Humber had started delivery in the highest percentage of the properties intended to receive measures (22%), followed by the North West (19%) and the East of England (18%) (n=6,519 properties).

Table 13: Total properties planned to have measures installed in Wave 2.1 by region, latest project plans (Change Control data) vs DESNZ scheme statistics as of the end of July 2024

Region	Number of properties planned to or have measures installed	% of properties planned to have measures installed	Number of properties with measures installed as of end July 2024	% of properties with measures installed as of end July 2024	% progress at end July 2024 vs latest project plans
East Midlands	7,238	8%	428	7%	6%
East of England	9,440	11%	1,163	18%	12%
London	15,809	18%	343	5%	2%
North East	5,919	7%	501	8%	8%
North West	13,118	15%	1,246	19%	9%
South East	6,356	7%	334	5%	5%
South West	5,176	6%	35	1%	1%
West Midlands	7,635	9%	1,050	16%	14%
Yorkshire and the Humber	4,932	6%	1,419	22%	29%
Total	**87,811**	**100%**	**6,519**	**100%**	**7%**

Source: DESNZ Change Controls Data, up to end July 2024, n=87,811 properties, DESNZ scheme statistics, accessed at: Social Housing Decarbonisation Fund statistics - GOV.UK (www.gov.uk), up to end July 2024, n=6,519. Excludes ventilation. Excludes two projects incorrectly logged as cancelled.

Measures installed

This section explores the delivery of measures installed as of the end of July 2024 (planned at bid stage compared to current delivery data), and the distribution of measures by specific type.

According to project plans as of July 2024, the scale of measures planned to be installed had reduced by 21% since the bidding phase was concluded in April 2023. A total of 13,926 measures were reported as completed in official statistics as of the end of July 2024.

Overall volume of delivery

As of July 2024, the latest project plans indicated that projects had delivered, or planned to deliver, 235,020 measures across Wave 2.1. This represents a 21% reduction in overall delivery compared to bid stage, when 297,071 measures were planned to be installed, amounting to 2.7 measures per property, down from 3.2 measures per property at bid stage. This compares to a 10% descoping in terms of measures at Wave 1, which resulted in an increase in measures proposed per property, from 2.2 to 2.4. However, at Wave 1 very little ventilation and glazing was included in bids. Much of the increase in measures per property at Wave 1 related to adding needed ventilation and double glazing to plans.

In interviews, SHLs attributed their changes in project plans to a variety of reasons. One SHL reported adjusting measure plans after learning the properties included in the scheme were different to expectations, due to poor information on properties prior to inspection. In some instances, they were unaware that loft insulation had already been installed or that existing cavity wall insulation was not what they expected. Another SHL said although they planned to install EWI in many properties, they had to change this measure for some properties. This was because they were situated within flood risk areas reducing the potential value of the properties such that EWI was not a good investment option.

Delivery over time

As of end of July 2024, 13,926 measures had been installed (including 1,918 ventilation measures[38]), 5% of overall planned delivery.

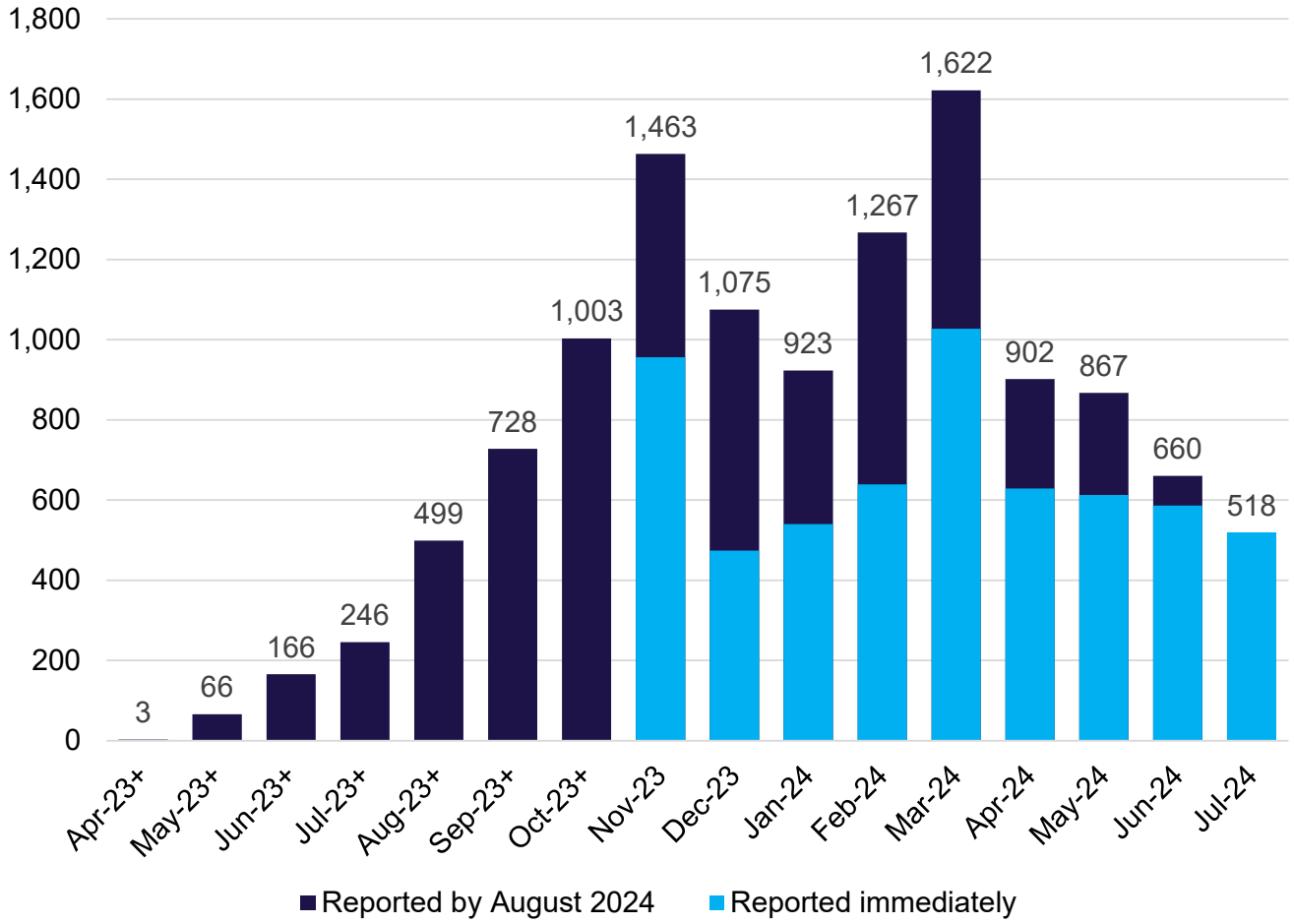
The number of measures installed by projects rose steadily between April 2023 and November 2023, but dipped in December 2023 and January 2024 before peaking in March 2024 at 1,622 installations, in the run-up to the end of the financial year. Following this, the number of installations reported began to decline again, settling at 441 for the most recent submission in July 2024.

While this would appear to represent a 68% decline in the number of measures installed since March 2024, it is likely that recent delivery is significantly under-reported. The variation in bar colour in Figure 6 helps to illustrate this issue, following the same method as was described for Figure 5.

As can be seen, although there appears to be a drop-off in provision since March 2024, a substantial proportion of installations in earlier months are reported late (shown in dark blue). Similarly sized dark blue bars are expected to be added for months from approximately April 2024 onwards as further late data is submitted by projects over the coming months.

[38] Ventilation measures are not shown in headline figures in official statistics releases, but are included here for consistency with other data sources to which they are compared throughout the report.

Figure 6: Number of measures installed* in Wave 2.1 by month, as of end July 2024



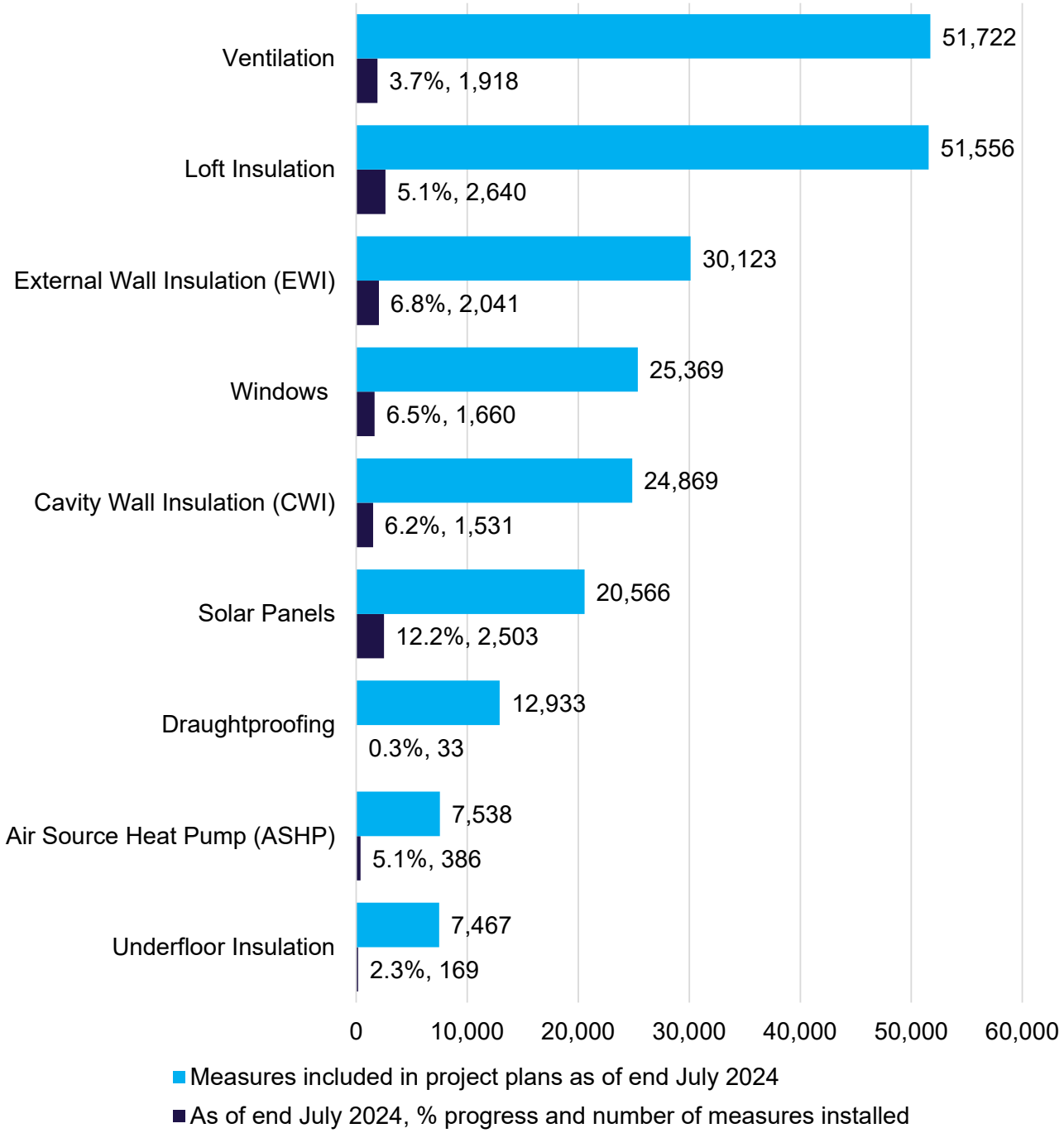
Source: DESNZ scheme statistics, accessed at: Social Housing Decarbonisation Fund statistics - GOV.UK (www.gov.uk). *excludes ventilation measures, since these are not included in time series data in official statistics. +First data reporting for Wave 2.1 in DESNZ scheme statistics was in January 2024, so these completions could not be reported immediately.

Distribution of delivery

Ventilation was the most common measure planned to be installed as of July 2024, accounting for 22% of the total measures (see Figure 7). However, only 1,918 ventilation measures were reported to be installed as of July 2024 (4% of the planned total).

Loft insulation was the next most common measure planned to be installed (22% of overall delivery), followed by EWI (13%). As of July 2024, Solar Panels were the measure that was most likely to have progressed compared to original plans (12% delivered); draughtproofing was the least likely to have progressed (0.3% delivered).

Figure 7: Measures included in Wave 2.1 project plans as of the end of July 2024, compared to number of measures installed and % progress as of end of July 2024

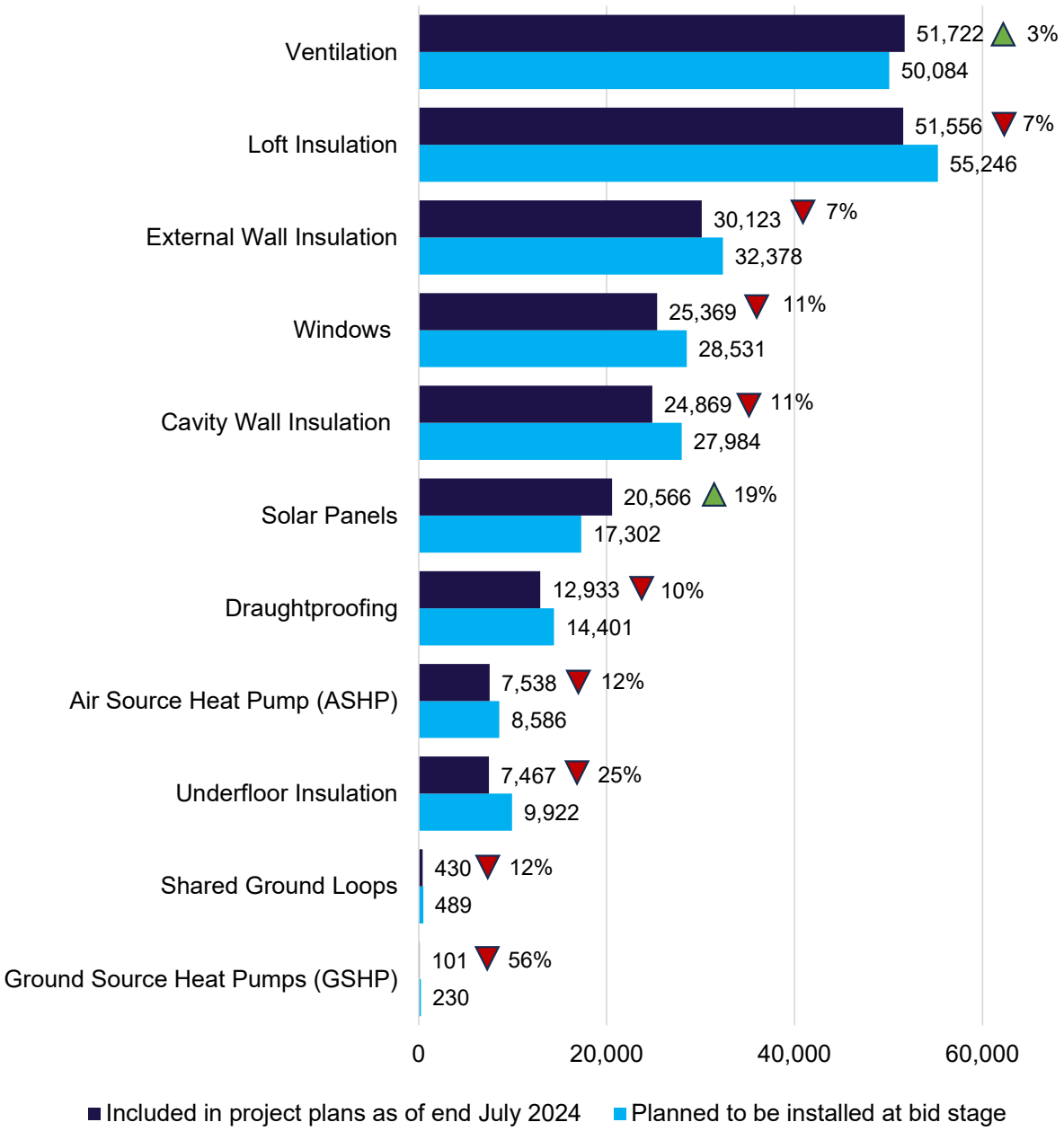


Source: Change Control register, up to July 2024; DESNZ scheme statistics, accessed at: Social Housing Decarbonisation Fund statistics - GOV.UK (www.gov.uk), up to July 2024. Measures not included in project plans (Energy Efficient Lighting, Heating Controls, IWI) not shown. Ground Source Heat Pumps excluded since delivery exceeds stated plans, likely due to confusion in data recording with Shared Ground Loops. Change Control registers excluded two projects incorrectly logged as cancelled.

As shown in Figure 8, the volume of specific measures planned to be delivered by projects evolved from bid stage (indicated by the red and green arrows on the chart).

A comparison of measures planned to be installed at bid stage with those planned or delivered as of the end of July 2024 shows that the most substantial descoping[39] was for underfloor insulation (−25%), ASHPs (−12%), and CWI and windows (both −11%). As for Wave 1, overall plans for Solar Panel installation have increased compared to plans at bid stage (+19%), although by a much smaller margin (+76% at Wave 1), as well as Ventilation (+3%).

Figure 8: Measures planned to be installed in Wave 2.1 at bid stage vs planned or delivered as of end July 2024



Source: Change Control data, up to end July 2024; Delivery data, up to end July 2024. Change Control registers excluded two projects incorrectly logged as cancelled.

[39] Excluding GSHPs (−56%), which are very low in overall volume.

Delivery costs

Projects reported spending 36% of funding as of the end of July 2024. Measure costs increased relative to bids, but not to the same extent as in Wave 1.

Projects reported spending £580.3 million on capital costs and £101.8 million on administrative and ancillary spending as of the end of July 2024, 16 months into the Wave 2.1 scheme, according to DESNZ project monitoring data. This is around 36% of the £1,881.5 million spending proposed in the latest project plans[40], which cover up to 2½ years (to September 2025).

However, as of July 2024, only £52.4 million of spending on installation of specific measures in specific properties has been reported to DESNZ by projects, around 9% of the overall capital spending reported. This suggests that information on installation costs is partial at present, and covers only a limited portion of actual installation activity so far. However, it is possible to draw some conclusions from the data, bearing in mind that results may change as more complete information becomes available.

As shown in Figure 9, generally, installation costs are frequently higher than the planned costs for measures in bids, indicating some degree of cost inflation. The level of cost inflation is lower than at Wave 1 when all measures showed increased costs, but it is still expected to have a significant impact on some projects, as noted in the 'Risks identified' section below.

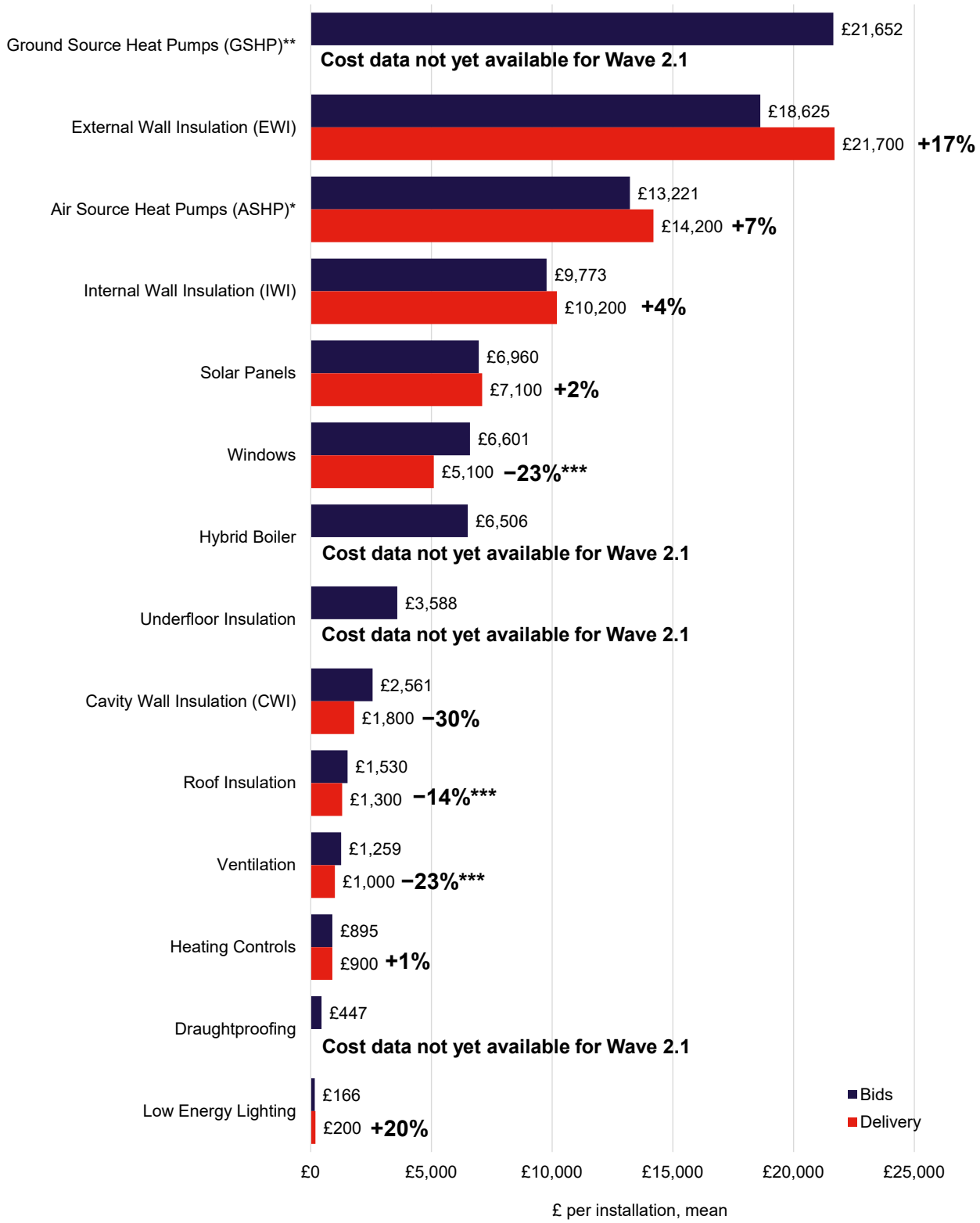
The measure showing the largest increase[41] is EWI (+17%), which is aimed at improving heat retention of older properties built before modern standards. In contrast, Windows (−23%), CWI (−30%) and roof insulation (−14%) were cheaper to install than planned. ASHPs showed a small increase in costs per property (+7%) and solar panels were broadly in line with estimated costs (+2%).

Not all cost inflation will be accounted for in these figures; in case a project has an unexpected need for additional measures to be installed, this will increase project costs, but will not be reflected in data on average measure costs. For example:

> *"So that's one of the biggest issues we're having really around loft insulation is the volume of things that are in there and whose responsibility is to deal with that. And it's already quite an expensive job anyway. The loft insulation itself is around £1,000 to £1,500 to install. But when you add on clearance and then the ventilation strategy, which you have to do as part of PAS2035, it's about [£3,000 to install]." SHL*

[40] From Change Control documentation, end July 2024.
[41] Low Energy Lighting also shows a large percentage increase (+20%) but this is due to rounding in official statistics.

Figure 9: Costs of measures in Wave 2.1 at bid stage vs current delivery



Bid data is at project level (n = 107 projects). Delivery data is from DESNZ scheme statistics, accessed at: Social Housing Decarbonisation Fund statistics - GOV.UK (www.gov.uk), up to July 2024. Delivery data marked *** is from IFF analysis of delivery data at measure level, where official statistics are unavailable, based on 7,961 measures (61% of 13,121 measures reported completed); base varies per measure: Windows (446), Roof Insulation (1,291), Ventilation (1,483). * Includes High Temperature Heat Pumps ** Includes Shared Ground Loops.

Costs varied a little by region, as shown in Table 14. Considering each measure against the average cost for that specific measure type,[42] projects operating in the South East, East of England, London and East Midlands spent above average per measure, and those in the North East, North West and Yorkshire and the Humber below average for the same type of measures. The types of projects which spent the most per measure (34%) were nationwide projects, operating across multiple regions of England.

Table 14: Regional variation in measure installation costs in Wave 2.1

Region	Cost per measure, relative to average for same type of measure nationally	Number of measures reporting costs
North East	−12%	1,182
North West	−16%	1,047
Yorkshire and the Humber	−23%	32
East Midlands	+8%	309
West Midlands	−2%	1,725
East of England	+13%	859
London	+8%	236
South East	+29%	286
South West	no data	no data
Nationwide projects	+34%	333

Source: Delivery data, measures table.

On average, projects with fewer than 250 properties on average pay a 39% premium for measures of the same type, although this is based on a relatively small number of installations so far. Housing Associations also tended to pay more for similar measures, paying 16% above the average cost for their measures, while Combined Authorities on average paid 14% less than the average cost for their measures.

[42] To calculate this, we calculated for each project the average (mean) cost of each named measure. These were compared against the average (mean) cost of each measure across Wave 2.1 to produce a percentage difference from the average. For each project, the weighted average of these percentages was taken (by volume of measures installed by the project), excluding low value measures with an average installation cost of less than £1,000: Ventilation, Energy Efficient Lighting and Controls for a Heating System. This produced a single figure for each project, giving the difference in measure costs that project experienced across all measures installed.

However, this is adjusted only for measure type (e.g., ASHP), not outcomes or detail within measure type (e.g., brand, product type or features). If any project[43] were to purchase more expensive materials or products for reasons of quality or innovation, even if that decision were well-founded (e.g., a more expensive and effective type of ASHP), they would also appear to achieve lesser value in this analysis.

Table 15: Variation in measure installation costs in Wave 2.1 by project scale and type

Project scale and type	Cost per measure, relative to average for same type of measure nationally	Number of measures reporting costs
Less than 250 properties	+39%	220
250 to 999 properties	+1%	2,427
1,000 or more properties	−4%	3,228
Led by Combined Authority	−14%	1,184
Led by Housing Association	+16%	1,143
Led by Local Authority	−1%	3,585

Source: Delivery data, measures table. Projects led by a charity not registered with the Regulator of Social Housing were excluded due to the disclosive nature of the data.

Risks and mitigations

The risk management process was reported to be robust, but projects are nevertheless affected by a range of increasingly severe risks as they progress, in particular relating to cost inflation and timescales.

Risks to delivery and their associated mitigations were identified using the Wave 2.1 Risk Register, Project Summary data entries, and interviews with SHLs, supply chain stakeholders, and scheme delivery representatives.

Risk management

Findings in this risk management section are based upon data collection undertaken with scheme delivery stakeholders at a very early stage of scheme delivery only. At this point, scheme delivery stakeholders felt that the risk management process was robust. The DP controls the risk registers, which are reviewed weekly by the DA. Risks can be escalated to DESNZ as necessary through monthly project and scheme boards. The scheme delivery team explained that they incorporated lessons from Wave 1 and the Demonstrator to inform risk

[43] Hypothetically; no evidence is available to suggest any project either did or did not do this.

mitigation processes. They felt that collaboration and expertise-sharing between the DA, DP and IDT was effective in this area.

The DP's role in risk management was praised during interviews which took place during very early stages of delivery. The scheme delivery team felt that the DP had so far been able to identify issues early on, perhaps earlier on than if DESNZ were fulfilling this role themselves, based on the experiences in the Demonstrator.

Interviewees described how the DP had tried to reduce the impact of delays to mobilisation. A scheme delivery representative reported that the DP had mitigated delayed timelines through engaging at an early stage with projects, and working with DESNZ to develop a risk-based approach to communication with grant recipients. Once risks were identified, it was intended that the DP and TAF could support projects to resolve issues, including by accessing technical support for projects from the DP's consortium partners. Further interviews to assess the DP's performance in this area will follow later in the evaluation.

In early interviews, scheme delivery stakeholders suggested that the initial DP contract outlined a reactive approach for any remediation, in which support is offered to projects when they are already experiencing issues. However, one stakeholder suggested that it could be beneficial to move to a proactive approach, in order to limit the impact of some risks if they turn into live issues. For example, this would be useful for procurement risks, which have the potential to significantly impact delivery timescales if projects' procurement plans fail and/or have to be repeated. Scheme delivery stakeholder data collection was undertaken at a very early stage of delivery so it is not known how remediation has operated in practice.

Risks identified

This section summarises the main risks and associated mitigation strategies captured within project risk registers. The next section, 'Barriers to delivery and mitigations', expands on key risks and other barriers associated with project delivery.

The monitoring data supplied by projects as of mid-July 2024 provides insight into how widespread risks are. Projects can report up to 18 risks per month, each associated with a risk score from 1 to 25. In total, 105 projects of 107 had started reporting risk scores as of the end of July 2024. Often, risks are reported even if very low or resolved, so the analysis below focuses on risks with a score of 5 or higher (for the purposes of this report, scoring 15 or higher is considered a serious risk).

Risks information is primarily used to help project managers identify, assess, and monitor potential risks that could impact the project's success. Many of these risks may not materialise, and as such, may not be presented as an issue in findings discussed later.

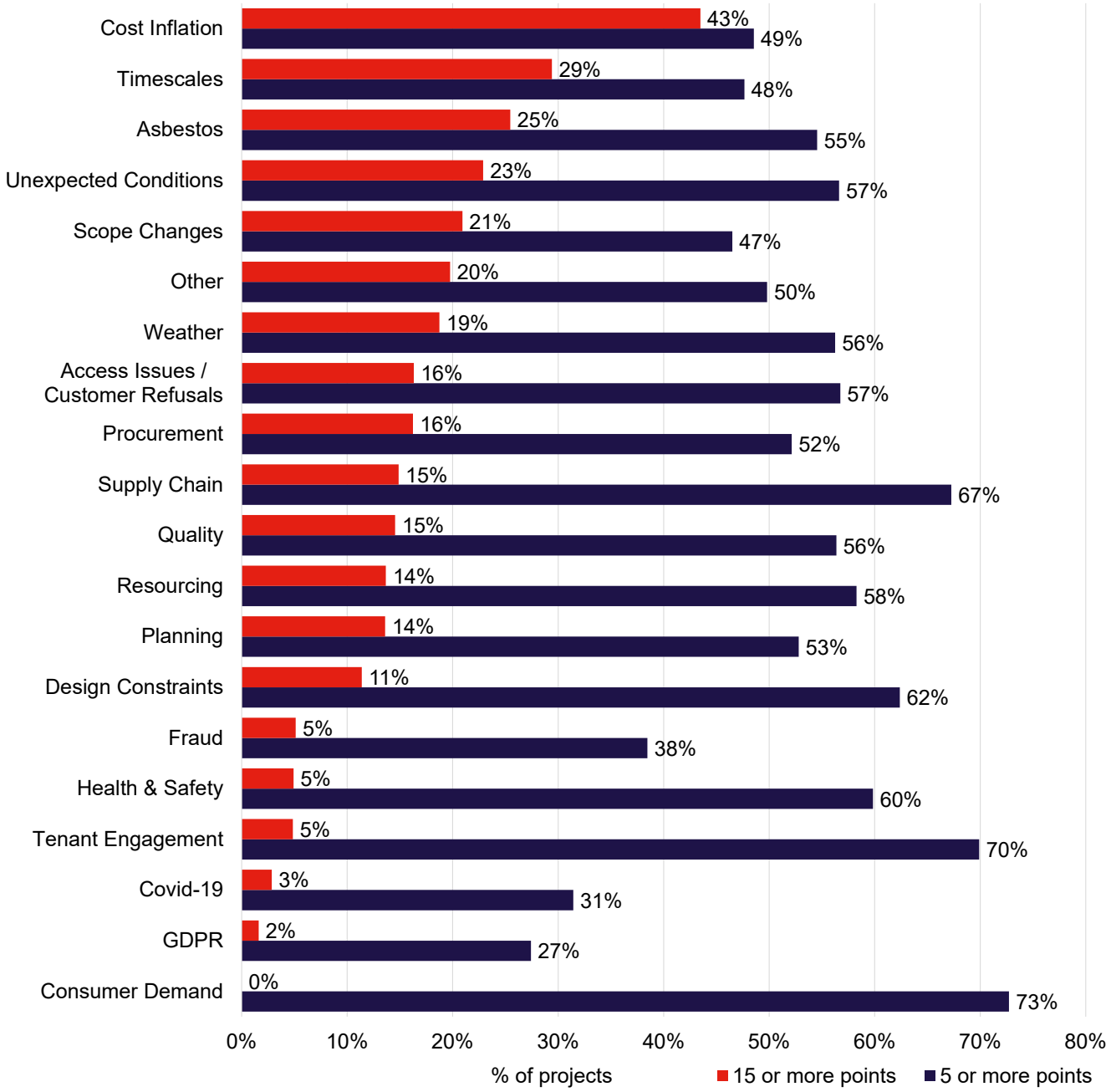
As shown in Figure 10, the following were the most common key risks as of July 2024:

- **Cost inflation was the most common high-level risk**, reported as an issue (scored higher than 5) by 49% of projects reporting risks, and a serious issue (scored higher than 15) by 43% of projects.

- **Timescales were also a key risk**, in line with feedback from projects and delivery scheme representatives, affecting 48% of projects, and representing a serious issue for 29%.
- **Asbestos was the third most common serious issue** (scored higher than 15) at 25% and 55% respectively, and was therefore the most commonly mentioned technical issue affecting measure installation.

Other issues were widespread although rarely considered serious, with tenant engagement (70%), supply chain issues (67%) and design constraints (62%) being the most commonly reported issues (score of 5 or more) but rarely rated as a serious issue for the project (5%, 15%, and 11% respectively).

Figure 10: Active risks reported by Wave 2.1 projects in July 2024 (higher risks (>15 points) compared with lower risks (>5 points))



Source: Risk data, end July 2024. Current risks excluded two projects incorrectly logged as cancelled.

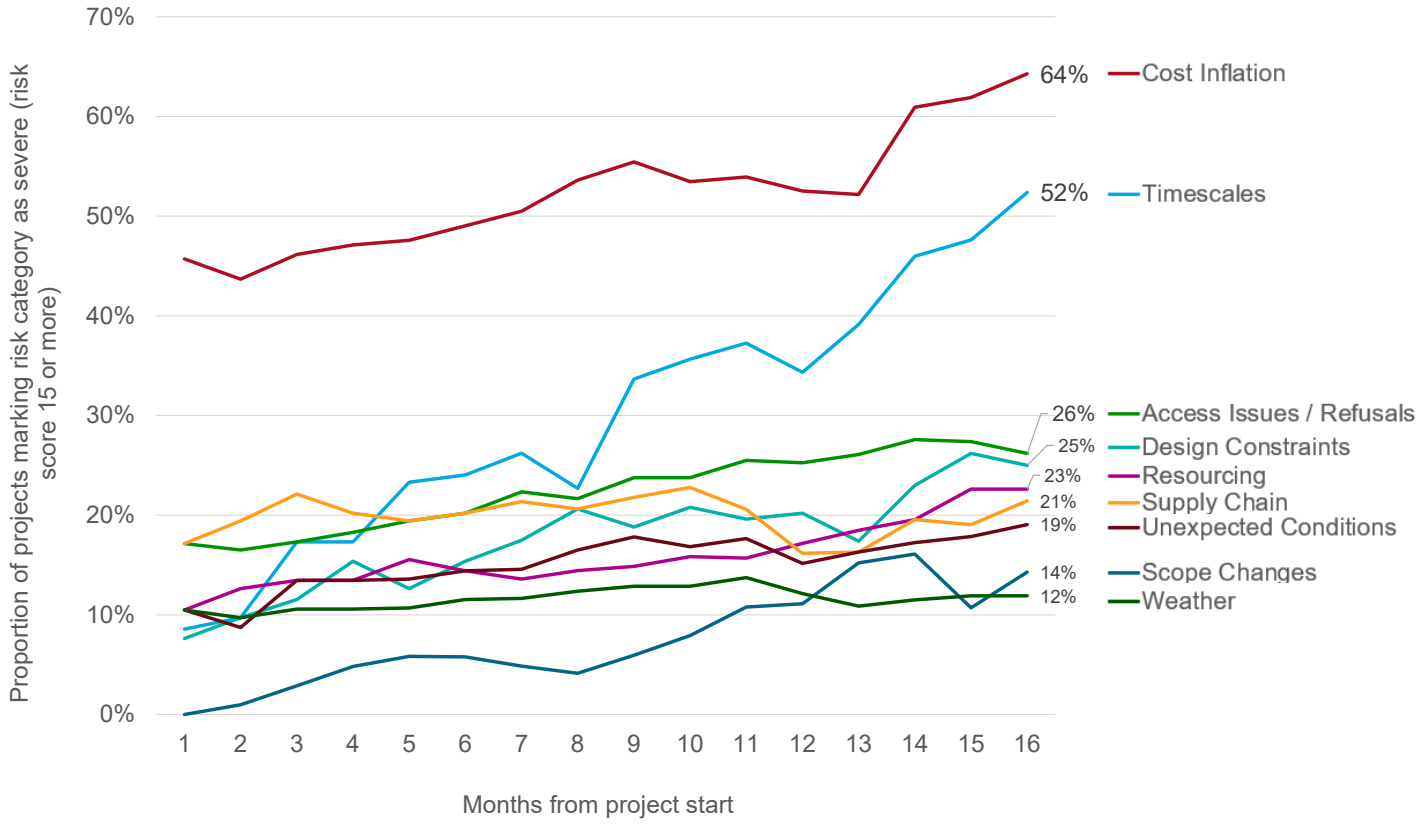
Risks over time

Overall, risk scores consistently increased as a project progressed, with a higher proportion of projects reporting severe risks in later phases of the project. Figure 11 examines the proportion of projects marking each of the major risk categories as severe over the project life cycle (with month 1 being from their first risk report[44]). This demonstrates that:

[44] This means the order of the categories will differ from Figure 10, which shows a snapshot of project progress in July 2024, regardless of where each project is in the project lifecycle.

- There was a **large increase in cost inflation and timescales being marked as severe risks** from project start to July 2024 with almost two thirds of projects by month 16 recording severe risks from cost inflation (64%) and nearly half reporting timescale risks (52%).
- There were smaller **increases in severe risks** being reported for **resourcing, design constraints, and scope changes**.
- Some commonly mentioned risks in the SHL and supply chain stakeholder interviews, such as **severe weather and supply chain risks, have so far remained relatively consistent** throughout the project life cycle.

Figure 11: Selected active severe risks (15 or more) by risk category reported over time in Wave 2.1 since project start



Source: Risk data, to end From April 2023 to July 2024. The first month risk data was recorded for each project is taken as month 1 for that project. To help the accessibility of the Figure, certain risks (e.g. Asbestos) have not been shown on this chart, typically where there has been very little change over time. Current risks exclude two projects incorrectly logged as cancelled.

Barriers to delivery and mitigations

Cost inflation and timescale shifts – the most commonly reported risks – were typically caused by initial delays to the awarding of funding and the lack of accurate assessments on properties planned to have measures installed.

Barriers to delivery and mitigations were identified using the Wave 2.1 risks log, Project Summary data, and interviews with SHLs and supply chain stakeholders. This section

examines the barriers and mitigations experienced by projects for the three most commonly reported severe risks: cost inflation, timescales, and resident engagement.

Cost inflation

Cost inflation was identified as the most commonly reported severe risk and barrier across all data sources. The most common action SHLs reported taking to address this issue was to reduce the scale of delivery, thereby potentially limiting the impact of Wave 2.1 funding.

> *"Costs have exceeded forecasts from the bid due to measure and property changes from modelling. This will result in a reduction of property numbers by project end." Project summary entry*

Supply chain stakeholder interviews and the project summary entries provide examples of the scale of cost inflation experienced by projects. In the project summary entries, one project noted that inflation had contributed to a 40% increase in the cost of installing certain measures, which resulted in the project changing scope and focussing on homes where it was easier to install measures such as bungalows.

Project risks data and supply chain stakeholder interviews regularly referenced the causes of costs inflation to be down to external factors outside of their control such as COVID-19, the war in Ukraine, the UK's exit from the EU, and the recent energy price increase.

However, there were factors contributing to cost inflation that were within the control of the projects. One regular issue mentioned by supply chain stakeholders and appearing in the risks data alike was a lack of agreed cost control and variation process during application and mobilisation. This caused inertia and delays when making purchase decisions in an inflationary environment, amplifying the inflationary effects.

The following issues also contributed to cost inflation affecting project delivery:

- **Pre-installation assessments revealing more work required** prior to measure installation. This meant that many projects had to spend more on remedial works than anticipated. This would manifest in project plan (change control) data as a change in measures required, rather than a cost increase per measure.
- **Unforeseen increases in labour costs from contractors**, alongside more general increase to day rates within the supply chain. Supply chain stakeholders varied in their assessment of the impact of this. One supply chain stakeholder reported that the increase in demand coupled with many labourers leaving the UK after its exit from the EU meant that there was a serious demand that had doubled the costs of labour. Other installers mentioned more manageable increases in labour costs of around 15%.
- **Certain measures experiencing considerable rises in cost**, such as EWI.
- **Higher levels of required corrections** (number of repairs post-installation) compared to the anticipated levels at the time of bidding.

SHLs and supply chain stakeholders interviewed, as well as risk data, also mentioned enablers and mitigations in place to deal with cost inflation, such as procuring materials early to avoid potential price increases and the creation of procurement frameworks. At the time of their interview, some SHLs were conducting reviews of project work to more accurately reflect the likely costs of works in order to mitigate the effects of any inflationary pressures.

> *"A significant review of the programme has been undertaken… This review is not unusual and allows the procured contractor to work with each partner to better understand any constraints they may have and also offer the consortium partners any economy of scales when delivering for the consortium as a whole. Each partner has been involved with the programme review and has committed to the revised programme plan. This means the indicative programme plan at bid stage has now been updated to reflect an actual, achievable, cost-effective programme plan." Project summary entry*

Other mitigating actions mentioned included:

- **Using a procurement framework** to agree rates for measures at a fair price (this is explained further in the 'Engaging the supply chain' section) by conducting regular market assessments in order to monitor costs.
- **Undertaking works expected to be impacted by cost inflation at the earliest opportunity**.
- **Liaising with DESNZ** if prices were to rise outside of preventative control.
- In some cases, **absorbing unforeseen costs** of increased remedial works and agreeing these with the supply chain quickly.

Timescales

The risk data shows that severe timescale risks have become the second most commonly logged risk with at least half of projects citing this as a severe risk by month 16 of project delivery.

SHLs and supply chain stakeholders reflected on how Wave 2.1 was particularly vulnerable to delays owing to the sequencing[45] implicit within its design. A delay to one element of that sequence could have compounding effects causing a much longer delay to the project overall, as preferred contractors may have secured other work elsewhere in the delay period.

Some interviewed stakeholders reported delays to the announcement of Wave 2.1 bid outcomes and/or Grant Funding Agreements (GFAs) being in place. Delays with GFAs were explained partially by this being a new, unknown process compared to Wave 1. This had a

[45] Sequencing refers to the need to install measures in a particular order, so as to prevent issues for the residents of properties with measures installed (e.g. sufficient ventilation is needed before new windows, doors, and insulation is installed to prevent mould build up). It is particularly common in Wave 2.1 installations due to projects' typical approach of installing multiple measures within an individual property.

negative impact on projects, which had to rescope and replan procurement often several months after their anticipated start date.

> *“One of the main challenges in getting anything going was the delay in getting decisions made external to us. It [delays] really expand because what the principal contractor needs to do is go into the market and do their own subcontractor procurement, and they can't do that unless they have got a confirmed work. We haven't got confirmed work until we've got a successful bid.” SHL*

> *"They seem very bogged down with paperwork and processes where we just want to get it off the ground... I've got competent subbies that have got all of their MCS certificates, we have got retrofit coordinators. We've been ready to go for a year and a half!" Senior manager at principal contractors*

The second stage where severe delays typically occurred was at the planning and assessment of works stage. The risks data, project summaries, most supply chain stakeholders and SHLs interviewed all suggested that projects had issues with the accuracy of property data. This meant that properties often required more remedial works than anticipated, or alternatively had to be removed from install groups (as they already had an EPC rating of C or above) and replaced with other properties. It was also noted in the risks data how there were impacts on some projects owing to changes in legislation such as the Building Safety Act or Fire Safety Act, which meant some proposed designs needed to be amended to comply with the latest legislation.

To mitigate against assessment related delays, one SHL insisted at the bid stage that a sample of property archetypes were assessed to improve data quality. This was successful in delivery, but they still had to submit change control requests to DESNZ, and prices still increased. Another SHL tackled this by omitting properties identified as unsuitable that they had initially selected and re-examining their portfolio to look for suitable properties to replace those that did not qualify. Many supply chain stakeholders noted how their SHL had helped to mitigate these scoping issues by being quick to agree rescoped projects, and being willing to absorb costs related to these.

There was also a specific challenge with projects installing solar panels; delays to Distribution Network Operator (DNO) engagement and applications caused overall delays to the wider project in these cases. SHLs interviewed believed that these delays were caused by a shortage of DNO authorised contractors that could undertake these works. Another SHL also reported some issues with DNOs where they wanted to put solar PV on rooftops, and they had overhead power cables which needed to be turned off whilst the panels were fitted.

Resident engagement

Resident engagement was the third most common severe risk logged by projects by Month 16. Reasons for this risk mentioned by projects included:

- **Residents being unavailable**, particularly during holiday periods, or delays in project progress leading to new scheduling that was unsuitable for residents.
- **A lack of understanding of the benefits** of having measures installed, and what these measures would look like in their homes.
- **Concerns over the perceived invasiveness** of particular measures, such as EWI and ASHPs.

Impacts of this risk included a few incidents of residents refusing works due to the above factors, and projects having to find replacement properties.

The 'Engagement with the scheme' section provides more information on the initiatives projects took to improve resident engagement.

Indications of value for money

Administrative and ancillary costs have so far made up around 15% of spending, with these proportionately much higher for those operating nationally and those retrofitting a small number of properties. Delivery costs so far have varied somewhat from costs in bids, but generally not to the same extent as in Wave 1.

Administrative costs

Spending reported so far in monitoring data submitted by projects suggests that an average of £988,321 per project (including both grant and match funding) had been spent by July 2024 on administrative and ancillary costs, and £5.6 million on capital costs (i.e., primarily installations). This suggests that administrative and ancillary costs have so far made up around 15% of spending; this may reduce over time since many projects have been in the start-up phase over this period.

There is a limit of 15% of grant funding which could be used for administrative and ancillary costs. Many projects had, as of July 2024, spent a higher proportion than this; however, it is highly likely that this is just due to administrative and ancillary costs occurring early in projects. It may also be that some projects spent grant funding earlier in the scheme, with the intention of using matching funding to cover additional administrative and ancillary costs later. Only six projects had made projections (as of July 2024) which suggested that they would eventually spend more on administrative and ancillary costs than they had budgeted at baseline.

SHLs reported that the property-by-property monitoring required by the scheme added significantly to their administrative costs, diverting resource that would otherwise be spent on delivering projects. On the other hand, scheme delivery staff representatives that monitoring had provided useful information.

Some SHLs felt that their efficiency as a project was limited by varying levels of support from individual Single Point of Contact officers (SPoCs), as documented above, and that this created costs and inefficiencies.

Administrative costs, as a proportion of spending as of July 2024, were substantially higher for some projects. For example, those operating nationally rather than in a particular region showed 25% of spending on administrative and ancillary activities as of July 2024, far above the average of 15%. Smaller projects (with 250 or more properties planned to have measures installed) also had a higher proportion of administrative spending as of July 2024 (18%) than larger projects (with 1,000 or more properties planned to have measures installed, 15%). However, within these larger projects, lower administrative spending was mainly found among large single-organisation projects (9% administrative spending), while large consortia had a higher proportion of administrative spending as of July 2024 (17%).

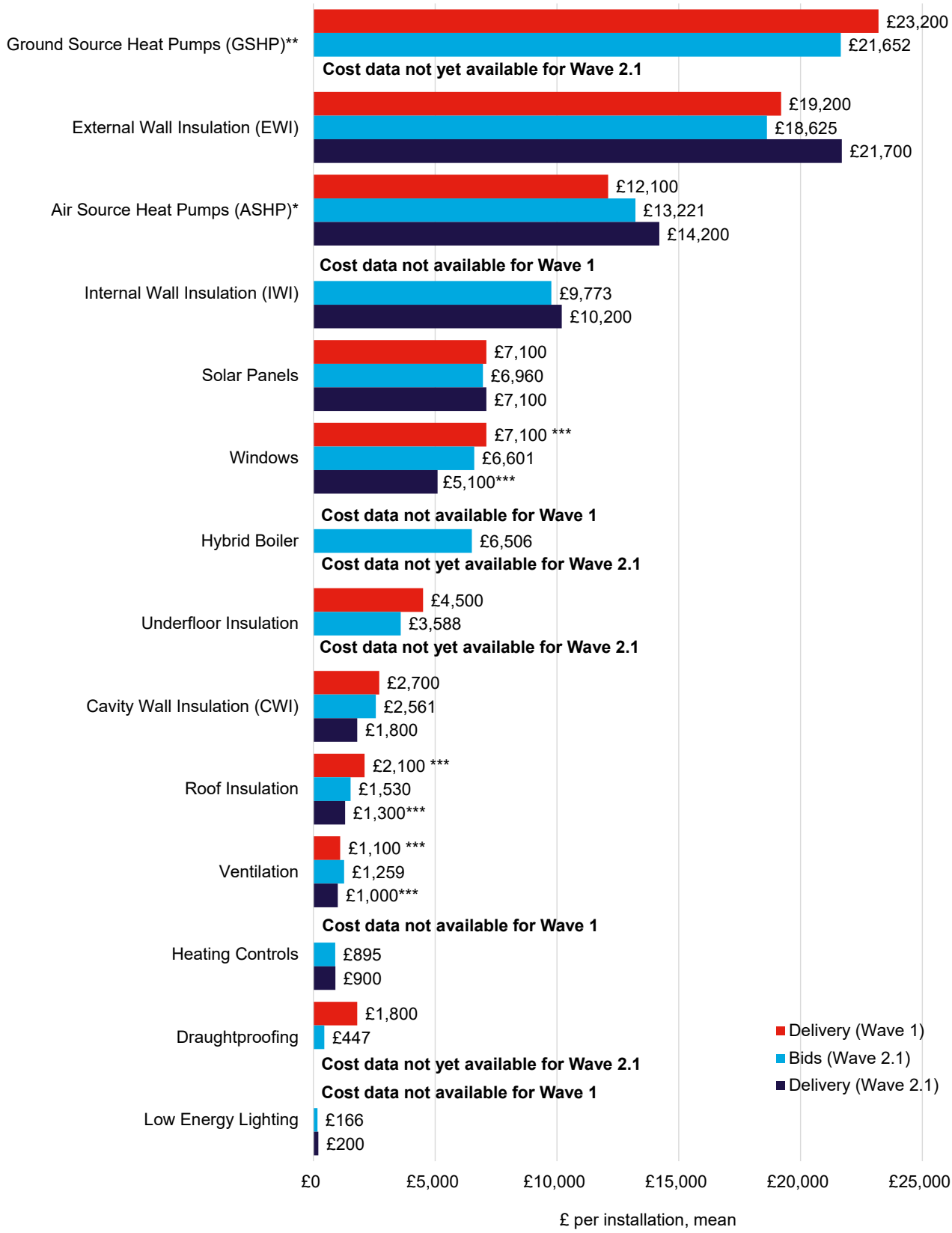
Measure costs

Substantial cost inflation occurred during Wave 1 between bids and delivery; projected costs in bids were much lower than actual delivery costs for all measures. The measure costs budgeted at Wave 2.1 in bid data were similar to the actual costs at Wave 1, as shown in Figure 12, indicating some learning from experience among projects and among retrofit contractors. Delivery costs so far have varied somewhat from costs in bids, but generally not to the same extent as at Wave 1, and some costs have reduced relative to Wave 1 delivery, indicating some improvement in value for money, in particular for established technologies such as loft insulation and Cavity Wall Insulation.

However, this is adjusted only for general measure type (e.g., ASHP), not outcomes or detail measure type. If any project were to purchase more expensive materials or products for reasons of quality, even if that decision were well-founded (e.g., a more expensive and effective type of ASHP), they would also appear to achieve lesser value in this analysis.

As noted above (see Table 15), substantial economies of scale on measure costs occurred in larger projects, especially those led by a Combined Authority.

Figure 12: Measure costs in Wave 1 and Wave 2.1



Wave 2.1 Bid data is at project level (n = 107 projects). Delivery data is from DESNZ scheme statistics, accessed at: Social Housing Decarbonisation Fund statistics - GOV.UK (www.gov.uk), up to July 2024. Delivery data marked *** is from IFF analysis of delivery data at measure level, where official statistics are unavailable; base varies per measure: Wave 2.1: Windows (446), Roof Insulation (1,291), Ventilation (1,483). Wave 1: Roof insulation (5,390), Windows (3,844), Ventilation (2,222). * Includes High Temperature Heat Pumps ** Includes Shared Ground Loops.

5 Developing and managing the supply chain

This chapter covers the supply chain perspective of Wave 2.1. It explores how effectively Wave 2.1 involved the supply chain by examining the views of those in the supply chain and SHLs on the quality requirements for installation and the impact of delivery at scale on costs.[46] The chapter predominantly draws on evidence from supply chain stakeholder interviews, drawing on SHL interviews and monitoring data as well.[47]

Procuring the supply chain

Whilst SHLs typically harnessed existing supply chain relationships, commonly this was not sufficient for the scale of Wave 2.1 works so a number of SHLs undertook a range of new procurement processes, including developing pricing frameworks.

Engaging the supply chain

SHLs highlighted the importance of harnessing long-standing relationships when procuring the supply chain for Wave 2.1, indicating the value of trust when commissioning large-scale retrofit projects. However, whilst these existing relationships were important, it was often the case that additional support was needed outside of their long-standing suppliers owing to the scale of the projects. In these instances, SHLs took a variety of approaches including:

- **Hiring a Procurement Officer** to research and develop a framework agreement with a price list for retrofit works for use throughout the supply chain.
- **Subcontracting the administrative side** of the retrofit process (e.g. assessments and modelling).
- Hiring staff with both contracting and consultancy expertise to **enable realistic and flexible procurement.**
- **Assessing stock for installations before procuring a contractor**; this enabled an accurate assessment of contractors needed for the work (reducing the risk of the costly and timely process of retendering) and a more accurate assessment of overall costs.
- **Tendering several sub projects** (either across time in waves, or across multiple retrofit coordinators at the same time), rather than all of the work in one go, allowed for shared learnings of best practice to be shared from a wider pool of knowledge and more adaptability when problems were encountered.

Supply chain stakeholders with new SHL relationships formed for Wave 2.1 were probed on why they were sought out; most mentioned their experience working to PAS 2035 standards.

[46] Evaluation questions addressed in this chapter: 1.8, 1.9, 4.2, 8.4, 9.1, 9.2 and 9.4.
[47] Supply chain outcomes and impacts will be explored in the Wave 2.1 impact evaluation.

> *"[lead contractor] approached us. It was just mutually beneficial. It was perfect timing. They needed us and we needed them." Installation manager*

The SHLs using a recruitment framework found it useful because it enabled a quicker recruitment process and helped keep costs down. One SHL was using an agreed set of rates developed by Fusion21[48] to create clarity for organisations throughout the supply chain. This also enabled supply chain stakeholders to negotiate accurate pricing during the mini competition as they could use the clear pricing specifications as a benchmark on what to expect from their suppliers.

Whilst the framework helped SHLs with costs and increased participation in mini competitions, some still experienced challenges forming the supply chain. These were primarily due to the shortage of accredited installers available to carry out the work as mentioned in the 'Barriers to delivery and mitigations' section. Some SHLs had not considered several procurement rounds were needed for each layer of subcontracting, which made the projects start much later than anticipated.

Motivations for engaging with Wave 2.1 projects

Most Wave 2.1 supply chain stakeholders interviewed had previous involvement in either the Demonstrator or Wave 1. Those not involved in previous waves had previously worked on other government funded retrofit schemes and were brought onto Wave 2.1 by senior contractors. There was only one installation manager that had not been involved in SHDF or any previous government retrofit schemes.

The value and job security of the Wave 2.1 contracts – owing to the scale (and close proximity) of properties treated and length of contracts – were the most common motivations for the supply chain deciding to participate in Wave 2.1, as was the case in Wave 1. Many supply chain stakeholders provided examples of how the volume of works and profits available through the scheme compared favourably to other schemes and projects, which focused on one-off installations at individual properties such as ECO, LAD, or HUG. Some supply chain stakeholders also felt that SHDF worked best for their organisation's business structure when compared to the other government funded schemes.

> *"I think it commercially works [for us]. It is something we were able to do at scale, so when we started with the Local Authority Delivery (LAD), which are privately owned properties and individual properties, they are spread sparsely around cities and towns. You can't get the same volume in scale and efficiencies as you can with an SHDF project." Installation manager*

Involvement in Wave 2.1 also presented business development opportunities, as key potential and current customers (i.e. SHLs) had identified SHDF as a priority project to deliver.

[48] Fusion21 is a social enterprise that specialises in procurement services, primarily for the public sector and social housing organisations in the UK. Their core mission is to help these organisations achieve cost savings while delivering social value and supporting community development.

Implications of accreditation and standards requirements

Most supply chain stakeholders recognised the importance of the Wave 2.1 standards in ensuring higher quality installations, however – like in Wave 1 – there were challenges in terms of the associated administrative burden.

Experience of Wave 2.1 quality standards among the supply chain

To be eligible for funding, all project installations had to be compliant with PAS 2035:2019 requirements, the British quality standard for retrofitting dwellings. Installers also had to be approved by Trustmark or equivalent. Installers were required to provide evidence that Wave 2.1 installations met PAS 2035 standards by providing records of decision-making and photographs.

In contrast to Wave 1, all interviewed supply chain stakeholders in Wave 2.1 reported they were already experienced working to PAS 2035 standards and became Trustmark accredited before taking on their Wave 2.1 projects. This was either due to being involved with Wave 1 or other government retrofit schemes.

Benefits of quality standards

The majority of supply chain stakeholders felt positively about the quality standard requirements for Wave 2.1, with most noting that these contributed to higher quality installations overall.

> *"PAS 2035 has been the single biggest change in how we operate in the 15 years I have been in the industry… It is the single biggest change that the industry has ever experienced, but for the positive." Senior manager at principal contractor*

Supply chain stakeholders often felt that the introduction of PAS 2035 had led to higher quality installations overall as it specifically targeted an improvement among those responsible for installing measures within the property, thus preventing "shoddy work".

The beneficial consequences of these standards were broadly corroborated by residents participating in the evaluation as described in later sections.

Challenges with implementing required standards

However, a few supply chain stakeholders felt that the costs of working to PAS 2035 standards outweighed the benefits of high quality installations. These supply chain stakeholders felt their work was already high quality, but the only material change they could observe with the introduction of PAS 2035 was increased administration costs.

Most supply chain stakeholders considered these increased administration costs to be primarily caused by the level of paperwork associated with PAS 2035. They felt this was difficult to manage, and often posed a challenge for the progression of projects.

> *"The paperwork is overkill. All it has done is put a block in the way of some companies being able to do the scheme because they don't understand the paperwork side of things, when they are probably doing the work already. It's been a massive, steep learning curve to get there." Senior manager at principal contactor*

One SHL's contract manager said that the "paperwork trail" was more in-depth than they had experienced on other projects. They therefore enlisted management staff on the retrofit coordinator training to try and increase knowledge and adherence, but the effects were yet to be determined. A few supply chain stakeholders agreed that the level of paperwork required for Wave 2.1 projects was much higher compared to other government funded projects, with more evidence needing to be provided throughout the installation process.

> *"On the PAS requirement we are OK, but I think it's on the SHDF side specifically, and the sensitivity of it being social [housing], there was a lot more that needed to be put into it. The same thing would have passed on ECO, but it would not have passed on SHDF. Even if it was the same person or team doing the job, I know that the SHDF is going to request further evidence". Senior manager at principal contactors*

Some senior managers felt that the level of paperwork and administrative burden associated with PAS 2035 compliance has led to installers being "put off" working on Wave 2.1 projects due to finding the level of paperwork "overwhelming". SHLs highlighted how the requirements diluted the pool of potential installers that could work on the project, exacerbating the workforce skills gap issues and raising costs.

> *"A lot of people go into construction because they do not want to read, they do not want to work with paper because they never enjoyed that. They always enjoyed building and getting their hands dirty. If we stick 30/40 pages of documents in front of them and say you have got to do this or that and check that, it starts to become a little bit overwhelming. Then you lose a lot of the supply chain as they think it is too much." Senior manager at principal contractor*

In addition to struggling with evidence requirements, SHLs found the Trustmark accreditation requirements difficult to enforce amongst their contractors. While retrofit coordinators are not required to have Trustmark certification for a specific product or service, their subcontractors must possess it. This created an additional burden for SHLs who had to undertake further checks because a subcontractor hired by a contractor who completed the procurement process may not have undergone the same procurement exercise ensuring the correct accreditations have been achieved to work on the project.

Resourcing challenges

Some supply chain stakeholders found the quantity of work they were expected to deliver for Wave 2.1 difficult to manage, contributing to delays in delivery.

Causes affecting supply chain resource challenges

Evidence from interviews with supply chain stakeholder interviews showed that many organisations experienced challenges in delivering installations across all the government funded retrofit schemes they were working on. One senior contractor stated how the resource constraints of engineers and assessors were a particular issue. They noted how the base of assessors and engineers in their areas is very small and there was too much demand for their work. Others reflected how they often had to prioritise certain government retrofit schemes over others. For example, one installation manager often prioritised the HUG project over SHDF, as their HUG contract was larger, while another de-prioritised ECO in order to focus on SHDF and HUG.

Competition between government retrofit schemes was not considered by all to be a concern. One supply chain stakeholder mentioned that they were able to work more effectively as a result of being contracted to multiple schemes.

> *"I don't think the government schemes are limiting each other in any way because we are allowed to form a bridge between them and work. They're complementing each other in that sense." Retrofit co-ordinator*

As mentioned previously, all supply chain stakeholders interviewed in Wave 2.1 reported they were already adhering to PAS 2035 standards and Trustmark accredited before agreeing to work on Wave 2.1. However, some noted that finding installers with the correct accreditations was a continuous struggle across all retrofit projects, not just this scheme.

> *“This is an ongoing impact. The skills shortage is real, industry-wide.” Senior manager at principal contactors.*

A few senior managers reported that the skills shortage, caused by a lack of accreditation in certain specific geographic areas and measure types, led to delays in projects.

> *“If you’re looking for someone that can deliver, for example, windows and doors, they have to have the certain specification. There’s two or three in the South West who are accredited to deliver it, and as you can imagine they have got a pipeline of 2-3 years of work down there…. Which means having to wait for 6 months, which then messes with programmes in terms of delivery timelines.” Senior manager at principal contractor*

Overcoming resourcing challenges

Despite the aforementioned challenges, most organisations were generally positive about how they were able to adapt and overcome resourcing issues earlier in the project. Typically, supply chain stakeholders sought to recruit new staff (although as discussed above this proved challenging for some), while some larger supply chain organisations focussed on training and upskilling staff.

> *"It's just having another extra 10 of everyone in everything. In the beginning it's difficult synchronising diaries and sharing teams, but now we've built our own growing team who are completely dedicated to [SHL's Wave 2.1 project]." Senior manager at principal contractor*

Secure investment via SHDF contracts means that supply chain stakeholders were typically less concerned about capacity, as they had the confidence to recruit new staff to fulfil project requirements.

> *"Our Founder is a very successful businessman and well up for investment, so I am in a very fortunate position that I don't have to worry about cashflow, so if there is work available it would be a case of recruit, recruit, recruit". Senior manager at principal contractor*

Shortages owing to installers not meeting quality standards requirements are continuing to be addressed by senior managers and retrofit coordinators, who are encouraging installers to acquire the training and accreditation they need to enable them to undertake SHDF installations in future. This is being achieved via in-house training, as well as teaming up with training providers to help installers gain National Vocational Qualifications (NVQ) Level 2.

Supply chain costs

Supply chain stakeholders reported that installing measures on multiple homes in close proximity to each other was a cost-effective approach to decarbonising properties.

Similar to Wave 1, supply chain stakeholders reported that the installation of measures on multiple homes in close proximity to each other was a beneficial, cost-effective approach to decarbonising properties.

> *"If you put the project within a 5-mile radius, you can operate 1 base, 1 location, and ship products around." Installation manager*

> *"Economies of scale allow you to provide a better pricing upstream, which then helps more properties gain funding, so you can improve more properties than you would have normally if you were doing them as one-offs." Senior manager at principal contactors*

As seen at Wave 1, they felt that by installing measures on multiple homes it reduced the overhead costs of a number of key aspects of installations, with some examples below:

- **Storing materials in the same location** for a site nearby was cost effective.
- **Transporting materials once** for multiple properties, resulting in fuel savings.
- **Re-using scaffolding**, thereby reducing costs.

Some supply chain stakeholders commented further on the scale of projects, and reported that the larger the scale of the project, the more efficiently the installations could be carried out and that it was better value for money for the businesses themselves.

> *"Whole estates are surveyed near enough at the same time, installations done near enough at the same time, to make sure that we're not going out to one street and then having to go back to it… it's done efficiently." Senior manager at principal contractor*

However, the slow start to Wave 2.1 projects led to timeline delays. Some supply chain stakeholders faced problems resourcing staff and materials when rushing to complete projects within the designated timescales. This reduced the quality of the work and led to mistakes, increasing the amount of post-works adjustments that needed to be made, and therefore adding to costs.

> *"With all government schemes they get going quite late, everything is quite rushed, and it is almost a year before it meets all the planning, and that needs to be factored in. You have a year to deliver something that is really quite difficult and challenging, so there is sometimes inefficiency." Senior manager at principal contactor*

Additionally, some supply chain stakeholders felt that inflation has consistently impacted project delivery, noting that materials costs and the price of labour had increased considerably. One senior manager at a principal contractor noted their costs had increased by approximately 14% to 18% which had reduced profit margins.

> *"We need inflation to go down to get better value for money… if our inflation goes up, we've got to pass that down on to the schemes… we have all got to make money." Senior manager at principal contractors*

However, a couple of supply chain stakeholders commented that inflation was inevitable in the current climate and that they mitigated for this within their project budgets and plans.

> *"It is built into the risk of the project overall… There are mitigating actions in place for high inflation." Senior manager at principal contractor*

Evidence from the risks data and SHL interviews showed that the main mitigation against cost inflation was a procurement framework where set costs are established for certain measures which helped keep bid costs from contractors realistic and consistent. Additionally, supply chain stakeholders and SHLs had built upon previous retrofit experiences (on SHDF and other government retrofit schemes) by working with the same contractors. This led to efficiencies of delivery that allowed the SHLs to retrofit a higher volume of properties than they otherwise might have been able to.

6 Resident engagement and installation experience

This chapter explores the resident experience of installations so far,[49] at the time of the pre-installation resident survey and interviews. At the time of the survey and interviews, many residents had installations completed or ongoing (24% and 22% respectively) and therefore were in a position to comment on the installation experience as a whole; the remaining respondents were able to comment on the process of organising their installations. However, this remains a partial picture, to be complemented by post-installation resident survey data included in the subsequent Wave 2.1 impact report.

Progress of installations

Works had been completed for around a quarter (24%) of residents at the time of the survey.

Just under half (47%) of respondents to the survey, conducted over three fieldwork periods between September 2023 and July 2024, reported that the installation of measures under the scheme had not yet started in their homes (n=1,867). One quarter (24%) reported that all works had been completed in their homes, 22% reported that works were still on-going (or more work was planned), and the remaining 7% were unsure of the status of the installation.[50] The installations were more likely to be completed for those who rented their property through a HA (27% compared to 19% renting through a local authority), those living in a bungalow (38% compared to 25% living in a house and 16% living in a flat, apartment or bedsit), and those who did not experience problems in their property immediately before the installation (32% compared to 23% among those with previous issues).

Awareness of SHDF

Three quarters (74%) of surveyed residents were aware that energy saving measures were going to be installed in their home.

Prior to taking part in the survey, the majority of residents were aware that energy saving measures were going to be installed in their home (74%). Within this group, approximately a third (32%) were also aware that the energy saving measures were being funded by SHDF.

[49] Includes material relevant to Evaluation Questions 1.10, 2.1, 5.1, 5.2, 5.4, 5.5 and 5.8.
[50] Note, throughout Chapters 6 and 7, residents who were unsure about the status of the installation were combined with those whose work had not started for analysis purposes.

Evidence from the qualitative follow up interviews conducted with residents who had completed the survey confirmed the relatively low awareness of SHDF. Those who were aware of the scheme had typically heard about it through a letter or home visit.

> *"What I understand is that the government, and I don't know if this is right or not, give a grant to the council to improve energy efficiency in houses, but I don't know how that is done." Resident*

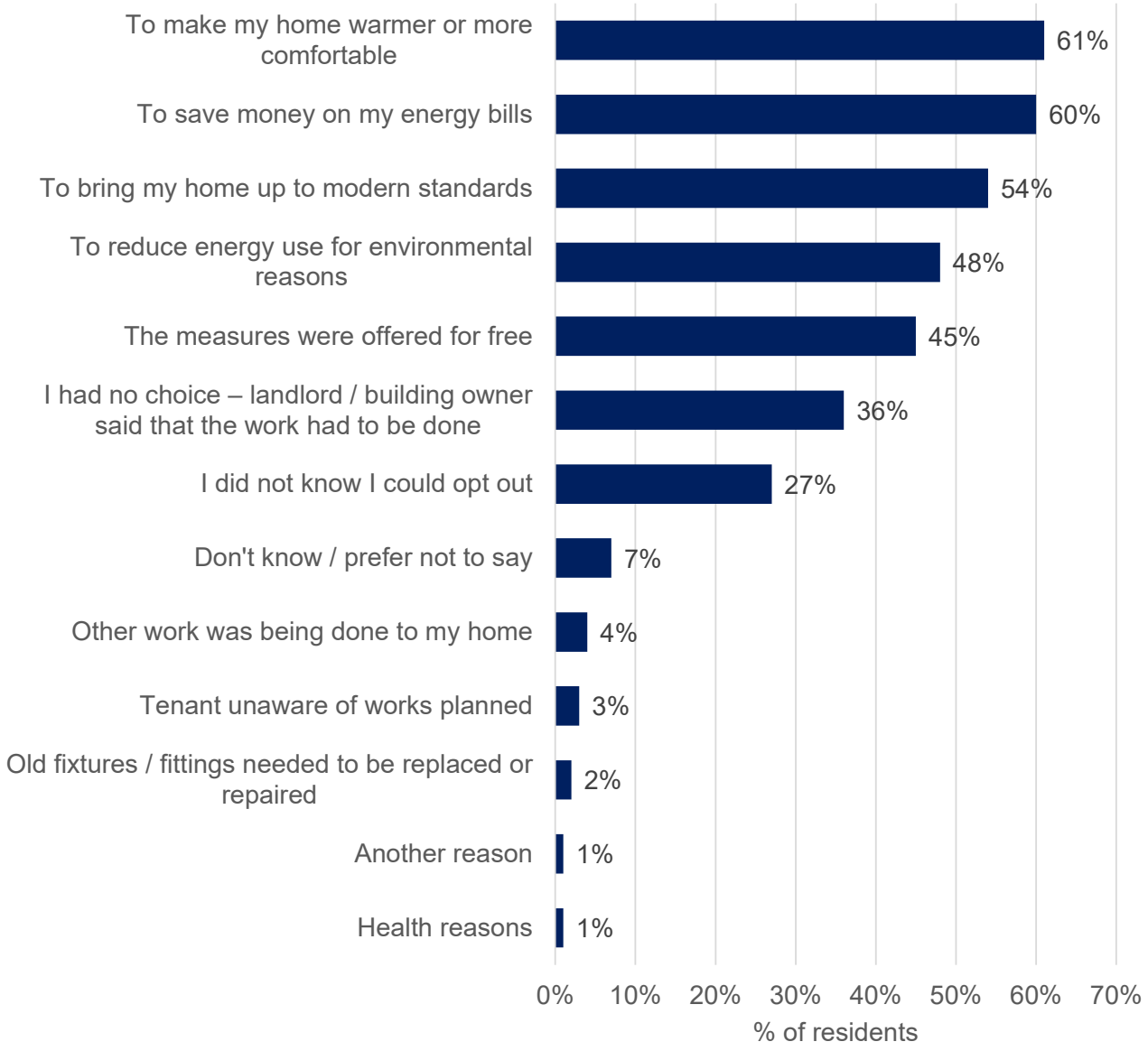
Engagement with the scheme

Popular reasons residents reported for agreeing to have the energy saving measures installed were to make their home warmer or more comfortable (61%) or to help save money on their energy bills (60%), but many thought they had no choice on whether the works would go ahead or said they did not know they could opt out (48% in total).

Motivations for taking part in the scheme

The most common reasons residents selected for why they agreed to have energy saving measures installed were to make their home warmer or more comfortable (61%) and to save money on energy bills (60%) (Figure 13). These were also the two main reasons given in Wave 1. This was consistent with reasons given spontaneously by residents in the qualitative interviews. During these interviews, some residents suggested their desire for a warm home was because of their age or their experience of a health condition.

Figure 13: Residents' reasons for taking part in Wave 2.1



Source: Wave 2.1 Resident Survey. F1 Why did you agree to have the energy saving measures installed in your home? Base: All residents (1,867)

Over 9 in 10 (91%) residents who completed the survey experienced problems with their home prior to installation (see 'Housing problems' in Chapter 7 for further detail on this). Those who had experienced problems were significantly more likely to select the top four reasons for receiving measures in Figure 13 compared to those who had not, suggesting they were more motivated:

- "To make my home warmer or more comfortable" (64% of those who had experienced problems in their home (n=1,694) vs 40% of those who had not experienced problems in their home (n=133)).
- "To save money on my energy bills" (61% vs 45%).
- "To bring my home up to modern standards" (55% vs 45%).
- "To reduce energy use for environmental reasons" (49% vs 36%).

A third (36%) of residents said that they had no choice in the matter and that their landlord had said that the work had to be done, while a quarter (27%) did not know they could opt out. Residents could give both responses. Both these proportions are significantly lower than in Wave 1 (50% and 31% respectively). Residents aged 75 or over were more likely to say they had no choice (48%) compared to other age groups. On the opposite end of the spectrum, those in London were least likely to suggest they had no choice (22%) compared to other regions.

Interviewed residents attributed their sense of having no choice to factors such as being tenants rather than owners, being informed rather than consulted about the installations, and seeing similar measures implemented in neighbouring properties. However, this lack of choice did not necessarily mean they were dissatisfied with the installation. Among residents who did feel they had a choice, the decision to have the measures installed was typically made alone or after a discussion with close family members.

> *"They didn't ask me; they told me they were doing it… I don't know whether it is because the three bungalows are all joined and they are doing the whole three. But they have said they are doing it to all three bungalows." Resident*

Most interviewed SHLs reported that residents wanted the planned upgrades, and resident refusal was not a significant issue. Two SHLs estimated the level of resident refusal to be between 1% and 10%. Another SHL positioned the greater challenge as being resident engagement, rather than outright refusal. This SHL described not being able to access residents' homes to carry out assessments, people not being home when they attempted contact and general difficulties during the first engagement with residents. Nevertheless, even if residents refused, two SHLs said that they were typically able to replace the properties easily by going through their reserve property lists. This enabled them to continue working on a sufficient number of properties.

SHLs noted some specific challenges during interviews when it came to engaging residents. One impactful example shared was that if a single resident in a tower block or low-rise building refused access to have EWI installed, this could stop the whole project. Early engagement was seen as a key way to mitigate this in order to introduce and explain to residents what they were trying to do and why. Other SHLs referenced highly disruptive measures, such as heat pumps, loft insulation and internal wall insulation as causing resistance among residents. To mitigate this, two SHLs gave an example of how they signed waivers to say they would take out and put residents' belongings back into lofts when installing loft insulation. However, this created a value for money concern given that this process was very costly.

> *"If you're doing something like external wall insulation, then one tenant can stop the whole project from going ahead for that because of their refusal to take part and cooperate. So, in those scenarios and we've had situations where whole address lists have had to be changed, abandoned with all the abortive costs that were incurred as a result of that... All that cost was aborted because this wasn't envisaged at the start. But one tenant refused access, and they couldn't get in and therefore the whole project had to be abandoned." SHL*

The SHLs interviewed all reported similar enablers to resident engagement. The key enablers that emerged were the nature and content of communication and the importance of staff involvement in resident liaison.

Examples of initiatives taken to engage residents included:

- **Sending residents correspondence** such as letters, leaflets, as well as **directing them to webpages**, and **conducting advanced phone calls** in order to prepare them for upcoming works. In some cases, webinars helped engage residents too.
- **Regular on-site resident and community engagement visits.** Projects mentioned conducting engagement sessions for those who were scheduled to have specific measures installed such as EWI, Solar Panels, and ASHPs.
- **Emphasising** how the **improvements would support resident** comfort and energy bills.
- **Using void** (i.e., currently empty) **properties as a pilot** to demonstrate what works would look like for residents.
- An **online booking system** for residents so that residents could choose appointments that fit around their schedule.
- **Conducting works over weekends** to avoid access issues, and **coordinating with residents** to ensure works caused the least amount of disruption.
- **Delivering** schemes **within a defined geography** (for example delivering improvements street by street or block by block) in order to build community relationships over time.
- **Installing smaller measures first** and leaving the more substantial measures for later down the line to avoid resident disengagement after the main measure had been installed.
- **Engaging residents throughout** the installation process and not just at the beginning.

The above efforts were often facilitated by the use of dedicated tenant engagement or liaison officers whose role was to coordinate resident engagement strategies. Having dedicated engagement officers allowed SHLs to be more effective in their strategy.

> *"This approach is bolstered by the invaluable contributions of our Tenant Engagement Officers. Our team's capability to connect with tenants and address their concerns has been notably enhanced, since we now have 2 tenant engagement officers taking charge of the engagement, leading to improved engagement efficiency. This is reflective in our KPI4 - Number of tenants engaged and signed up to works." Project summary entry*

Individual SHLs suggested it was useful to have certain other team members lead on resident engagement rather than contractors given their existing relationship with them. For example, consortium members who were experienced with how to work with communities to lead on relationships with residents. Alternatively, the same SHL suggested that SHLs should

introduce the contractors to residents first if they are leading on engagements to vouch for them.

Experience of installation process

The most common types of measures that residents had received at the time of the survey, or were expecting to receive, were extractor fans, loft insulation and double or triple glazing.

Types of measures planned or installed

The most common measures planned (or recently completed) among residents at the time of the survey were connected to ventilation or insulation. The most common measures were extractor fan(s) (48%), followed by loft insulation (41%), double or triple glazing (36%), cavity wall insulation (30%) and ventilation (29%). A smaller proportion of residents referenced clean heat measures, such as solar panels (24%) or heat pumps (2% Air Source Heat Pumps and 9% another/unknown type of heat pump).

Resident interest in having other energy measures installed was impacted by a lack of awareness of measures available. When asked during interviews if they would be interested in having other energy saving measures installed, the most common response residents gave was that they could not think of any. Other residents felt that they were restricted in what they could do due to not owning their property. Among those who did suggest other energy saving measures, the most common were solar panels (in order to produce their own electricity and hopefully save money) and replacing windows and doors that were old, draughty, broken or did not fit.

> *"For electricity, I wouldn't mind solar panels because I know that they are pretty good. We used to have solar panels. I don't know what else there is to be fair." Resident*

> *"If I owned the house I probably would...but as it is rented, unless the housing association decided to put a heat pump in…I would have to do research to make sure that it was saving me money." Resident*

Concerns about the installation prior to the works

Interviewed residents typically did not have major concerns ahead of planned installations. Where residents did suggest concerns, they tended to still want the installation to go ahead despite these. Concerns and drawbacks residents suggested can be grouped into four main categories:

- **General disturbance or disruption** – residents typically referenced noise and mess but for those experiencing more disruptive works, this also extended to removing garden fences, knocking through walls and having scaffolding up for a prolonged period of time.

- **Timing of works** – residents worried that they would not receive enough notice ahead of the works or that they might take longer than planned. Some residents were also concerned that their home would become cold if the works took place in winter.
- **Cost** – some residents were concerned that their rent may go up as a consequence of the new measures.
- **People in the home** – there was some concern raised by residents about having strangers in their home or that they would have to be at home for extended periods of time while the works took place.

  "No, I don't think so [referring to drawbacks]. I think the whole point of them is to improve things, for the environment, for cost, for day to day usage…" Resident

  “Bit concerned about people in the home, but these jobs need to be done.” Resident

Installation scheduling

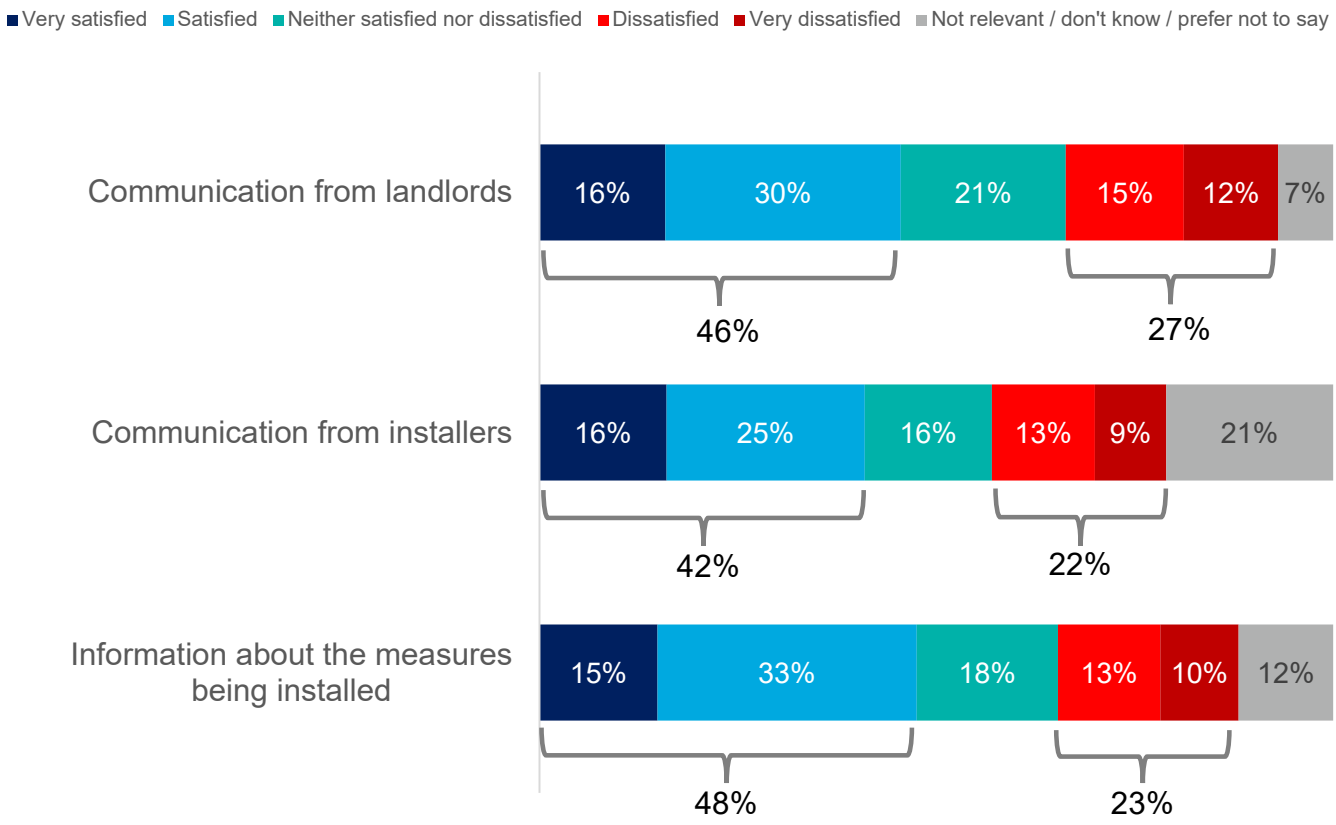
Among surveyed residents whose installation had been arranged or whose works had started, just over half (56%) agreed with the statement “the way the installation was scheduled was as convenient as it could have been, for me and my household” (n=1,091). A fifth (20%) disagreed with this statement.

Those who did not think the scheduling was convenient were asked to select the reasons why. The most common responses were that they were given little or no choice of date and time (49%), that they did not know how long it would take (43%) and the installers did not turn up when expected (37%) (n=357). Insights from the resident interviews also suggested a lack of clarity on the amount of time there would be between different stages of the installations. For example, between scaffolding being erected and works starting, or between one measure being installed and the next.

Communication with contractors and SHLs about the installation

Less than half of surveyed residents were satisfied with the communication from their landlord (46%) or installers (42%) and the information they received about the measures (48%). Residents wanted clear information about what exactly was planned and when the plans would go ahead.

Figure 14: Resident's satisfaction levels of different aspects of Wave 2.1



Source: Wave 2.1 Resident Survey. G2 Thinking about the information you have received so far about the energy saving measures, how satisfied or dissatisfied are you with the following? "Information about the measures being installed", "communication from installers" and "communication from landlords". Base: All residents (1,867)

As shown in Figure 14, 46% of surveyed residents were satisfied with communication from their landlords, while 27% were dissatisfied. Those with works completed were more likely to be satisfied than those whose works were ongoing or had not started (61% (n=456) works completed, compared to 54% (n=388) works ongoing and 36% (n=1,019) works not started). This could suggest that communication from landlords is particularly unsatisfactory in the early stages of the installation process.

Even fewer residents (42%) were satisfied with communication from installers, while 22% were dissatisfied. In line with the findings for landlord communication, those with works completed were more likely be to satisfied with communication from installers than those whose work was ongoing or had not started (68% (n=456) work completed, compared to 60% (n=388) work ongoing and 23% (n=1,019) work not started).

Nearly half (48%) of surveyed residents were satisfied with the information they received about the measures being installed, while 23% were dissatisfied. Following a similar pattern that emerged for landlord and installer communications, those with works completed were more likely to be satisfied with the information they received than those whose works had not started (69% (n=456) works completed vs 33% (n=1,019) works not started). There was no significant difference between those with works completed and those with works ongoing.

Residents taking part in the qualitative interviews were asked about their experience of communication during the installation process. The majority of residents first heard about the works in advance via a letter from their landlord. Opinions were mixed for whether a sufficient level of information was provided during this initial contact. The key pieces of information residents wanted were exactly which measures were planned to be installed and when this was planned to happen.

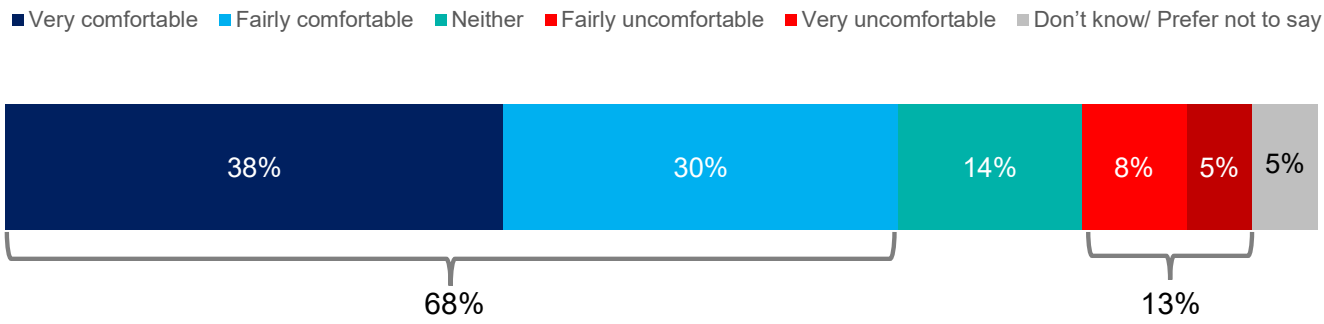
> *"The first time I learnt about it was that they put like a letter outside our building about what dates the works will start and what works was going to be done." Resident*

After the initial contact from their landlord, the majority of residents interviewed communicated directly with installers or contractors instead. In line with the survey findings, opinions were mixed for whether communication with installers was satisfactory. A larger proportion of residents were satisfied. Reasons for this satisfaction included that installers were accurate in when they said works would begin and clearly communicated what would happen at each stage of the installation. Among the smaller group of residents who were dissatisfied, this was down to a lack of clarity on when works would start and installers not turning up when they said they would.

A minority of residents were given the opportunity to talk to a landlord, council representative or contractor in person. These residents referenced community events, Q&As and even house visits to discuss the planned measures in more detail. In these instances, residents highly valued the opportunity to discuss the installation plans, which greatly aided their understanding of what was to come.

In the survey, residents were asked if they felt comfortable allowing installers into their home to install the measures. The majority of residents (68%) suggested they were comfortable, with only 13% reporting that they were uncomfortable (Figure 15). Those with work completed were more likely than both those with work ongoing and those whose work had not started to feel comfortable (76% (n=456) vs 68% for work ongoing (n=388) and 65% (n=1,019) for work not started). Similarly, significantly more residents reported they were comfortable in the post-installation Wave 1, compared to this wave. These findings could suggest that concerns residents have about having people in their home prior to works starting are then alleviated once work actually begins. Residents with poor mental health were less likely to feel comfortable allowing installers in their homes (59% (n=438) compared to 68% overall).

Figure 15: Residents that felt more or less comfortable about allowing installer(s) into their homes to install energy saving measures under Wave 2.1



Source: Wave 2.1 Resident Survey. F4 How comfortable did/do you feel about allowing the installer(s) into your home to install the energy saving measures? Base: All residents (1,867)

Satisfaction with the installation process

The majority of interviewed residents felt positive about the installation of their energy saving measures, although some reported negative experiences, having encountered delays, cancellations and frustrations with contractors.

In the qualitative interviews, residents were asked about their experiences of having the energy saving measures installed, specifically whether they had experienced any issues or disruptions and if they had any concerns after having their measures installed. Overall, most of the interviewed residents for whom the installation had started or been completed were generally happy with the installation process and with the outcome of the measures. This was consistent regardless of whether residents felt they had a choice in whether the installations were installed or not.

A few residents expressed their surprise at how positive they felt about their experience of having the measures installed, noting that contractors were helpful with updates, keeping mess both inside and outside of the property to a minimum and that the process was completed as quick as possible.

> *"The installers were very friendly… and they were very, very good at communicating with us by telephone. They also knew my hours of working, and they knew if they needed to contact me in my hours of working, they would drop me a WhatsApp message which I could reply to, without it being inconvenient to be on the phone whilst I'm at work." Resident*

> *"[The installation] was very quick and I was impressed." Resident*

However, some residents shared concerns around the length of time it took for measures to be installed as they often felt they were made to feel it would be a shorter installation period. Some of these residents also noted experiencing several delays or cancellations and rebooking of measures throughout the process. One resident expressed their frustrations as

they were initially informed that an approximate timeframe for all the measures to be installed in their property would be “4 to 6 weeks” but the actual time was “about 3 months”.

Additionally, some residents who required scaffolding works specifically expressed frustrations with the length of time for the works to start after having the scaffolding put up around their property. A few residents noted they had scaffolding installed in their property for months before any works actually took place, with one stating that scaffolding was put up in October 2023, but works did not begin until January 2024. However, in 2 of these cases where residents had to wait 3 to 4 weeks, they did note the delays were due to severe weather.

However, of those who reported experiencing longer than expected timeframes for their installations to take place, they were often having more measures installed than they initially expected. So, although many were frustrated with the timeframe for the installations, they were pleased with outcome of the measures installed.

> *“They also replaced my roof and replaced everything in the loft. So, if you can imagine the cost of that! And, because the loft insulation used to be something like 2 cm thick and now it's 15 cm thick. The tiles used to be a centimetre thick and now they are 3 cm thick.” Resident*

A minority of residents expressed a more negative view of their experience of having the measures installed as they shared frustrations over times when contractors or installers had arrived to start work without any prior notice.

On the other hand, although some residents were frustrated with the length of time it took for measures to be installed and some faced issues with delays and cancellations. Most were understanding that the construction works associated with the installations would inevitably be disruptive and felt that the level of disruption was easily forgotten considering their standard of living would be improved.

Most residents felt that the level of disruption experienced was minimal, with two main factors being highlighted:

- Multiple measures being installed in the same day for example doors and windows, which reduced impact on their heating and reduced the amount of constant noise.
- Contractors being tidy and cleaning up after themselves.

> *“The lads were really good. They brought the stuff down and allowed me to check what was what… the insulation was put down. Every bit of rubbish was put into the van and off they went.” Resident*

> *“Apart from a bit of dust that was it, I was not bothered.” Resident*

> *“They more or less did every room at the same time.” Resident*

However, some residents reported experiencing a range of disruptions and issues throughout the installation process. A common frustration faced by those who experienced issues during the installation process was litter left behind by contractors unrelated to the construction works,

with residents noting they left behind cigarette butts, cigarette boxes, and food and drink wrappers.

A few residents also noted construction works related rubbish and "mess" left surrounding their property which they were left to clean themselves after contractors had left. One resident stated that the leftover rubbish and waste from the construction works could not be collected due to where it had been left, and they felt that the contractors should have been aware of this and stored it correctly to allow for collection.

> *"The only issue that we had was the rubbish couldn't be picked up because it being underneath the scaffolding the rubbish people wouldn't take it." Resident*

A minority of residents noted disruptions related to their heating during the installation process, as they had to turn their boilers or heaters off for extended periods of time to allow for measures to be installed. These residents felt that the installation of these measures taking places in the coldest months of the years was an oversight that would need to be better considered for future installations.

> *"It was disgusting that I was left without heating." Resident*

> *"It was quite uncomfortable for a few days as it was January." Resident*

Immediate concerns following the installation of measures

Once the measures were installed, the majority of interviewed residents expressed no immediate concerns around their new energy-saving measures. A few residents expressed their pleasure with the new measures as they had seen an immediate impact on their bills.

Other residents were simply pleased with the quality of the new measures in their homes and had experienced no issues with them since installation.

> *"I have nothing but praise for both the central government and the people that executed it." Resident*

However, a minority of residents who had new windows installed were experiencing draughts in their property since installation. One resident noted they could see a physical gap between their window and the countertop in their kitchen which is allowing a draught through. They have since sent a picture to their contractor, but no installer has returned to the property to fix it.

On the other hand, some residents had mentioned specific concerns or issues with their installed measures that have since been rectified by contractors:

- Heat pump installed in the incorrect location originally.
- Window cracked shortly after installation.
- Hole left in the wall following cavity wall insulation.
- Extractor fans had stopped working.

In the post-installation survey, residents will be asked about issues occurring in their property due to the installation of measures in Wave 2.1.

Overall experience of the installation process

Similarly to Wave 1, most of the residents taking part in interviews had a positive experience during the installation of their new measures. Even though some of the residents were less pleased with the length of time taken for measures, or experienced some small disruptions during the process, they still felt that the overall experience was positive as the negatives were outweighed by their improved homes.

> *"Very positive. Just the way the whole thing was handled and the way the people were. The lads were brilliant – very polite and checked everything… it went nice and smooth." Resident*

> *"Because everything that they have done has been really good to try and make your house really warm. I can't complain about anything." Resident*

However, residents who experienced multiple disruptions, delays, cancellations and more significant issues expressed more of a negative overall experience of the installation process. These residents had previously highlighted their displeasure with their experience earlier in this chapter.

One resident was specifically negative around the length of time it took for the different measures to be installed as it meant multiple contractors in and out of the house over month long periods, when they would have preferred for it to all be completed in their property in a shorter time frame.

> *"Horrific!... I can't understand why they would do bits and bobs on the house, go onto the next one and do bits and bobs… just do a house and get it done. I can't understand how you are saving any costs that way." Resident*

Another resident felt negatively about the installation process due to the quality of the measures installed, as well as the damage left to the inside of their property. They shared their concerns that they felt the contractors and landlord simply wanted to improve the aesthetic of the house, whilst not caring about the quality of the measures inside.

> *"It was almost like, all they were bothered about was the cosmetic look of the houses, and they were not bothered about how the work was done, and they said that it had been done to a good standard, but it hasn't." Resident*

Support with the installation

Most residents taking part in interviews were satisfied with the level of support received from contractors and landlords during and after the installation of their measures were completed.

During the qualitative interviews, residents were asked how confident they felt in their understanding of how the new measures being installed in their home would work, and if they would be confident to use them. Confidence among interviewed residents varied regarding their understanding of their energy-saving measures installed in their homes. The difference in their understanding was often linked to their familiarity with the specific measure and their technological capability.

The majority of residents understood that the new measures would provide improvements to their property. However, some felt they lacked understanding of how the measures would act to save energy usage within their home. Residents who were having measures installed such as windows, doors and external wall or loft insulation often felt they did not require any further support in understanding how to use these features or how they saved energy in their home. Residents having more elaborate measures installed, such as solar panels, expressed uncertainty on the way in which they would function to save energy and the way in which they would be controlled (for example, if this would be via a remote or an app).

Additionally, of the residents who had solar panels installed, a few expressed interest in finding out more about how much of the energy generated by the solar panels on their property was going to back to the electrical grid versus being used within their homes.

> *"[Solar panels] I would like to know, how much of the energy goes into the grid and how much (actually) goes into my home, do you know what I mean, because I wasn't told that." Resident*

A minority of residents who had noted during the interview that they were not technologically inclined, expressed uncertainty on how exactly the new measures worked, and were often unsure of how the measures functioned to save themselves energy and money. Of these who expressed uncertainty with the measures due to their technology capabilities, some mentioned that a physical demonstration by installers or a video would be better suited to help them understand, rather than a leaflet or booklet.

> *"I'm 56 and I'm that person who's not up with the technology… Can't even programme the TV." Resident*

Those who had not yet had all their installations completed in their home were understandably less likely to have considered their confidence levels regarding the new measures to be installed. These residents expressed hope that the installers would provide them with thorough demonstrations upon the completion of their installations to ensure that they understood how to use the new measures correctly.

> *"Solar panels, I don't know how they work. I don't know if there is anything I have to do with the solar panels. I'm assuming they will go through all of that with me." Resident*

7 Residents' views of their home and energy efficiency

This chapter explores residents' views on their home and problems they face relating to energy efficiency and keeping their home warm, and their views on energy efficiency more generally.[51] These are early findings arising from the initial pre-installation resident survey and interviews, although, as noted in Chapter 6, some residents already had installations completed or in progress at the time of fieldwork. However, this remains a partial picture, to be augmented by post-installation resident survey data in the subsequent Wave 2.1 impact report.

Residents' experience of their home pre-installation

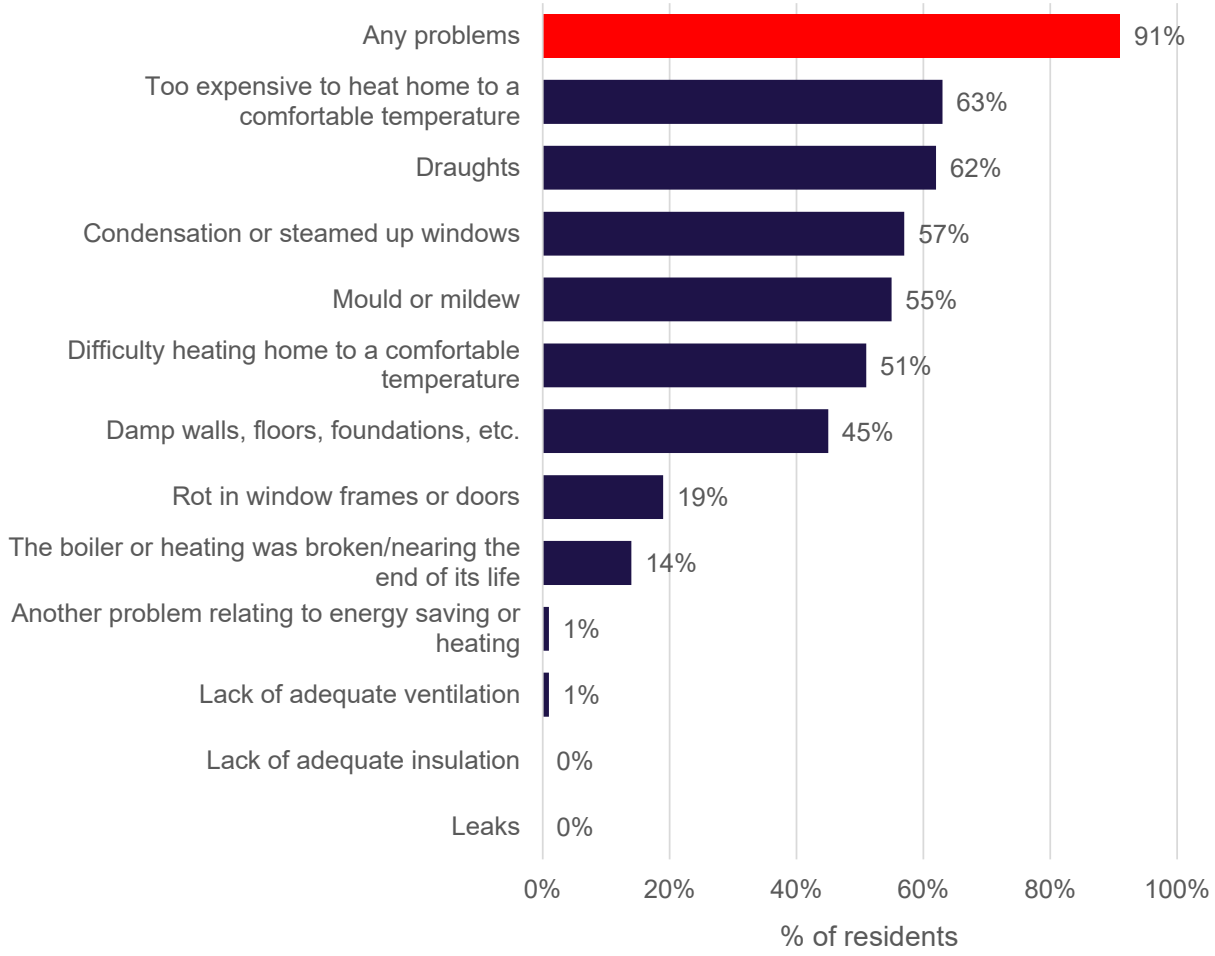
Residents surveyed usually had difficulties keeping their homes warm, and frequently reported problems such as mould, mildew and damp. Most found their energy bills unaffordable, and many keep their homes colder than they would like.

Housing problems

In the survey, residents were asked about problems in their home either at present if they had not had any energy measures installed yet (54%), or prior to their installation if works had begun or were completed (46%). Just over 9 in 10 (91%) respondents reported experiencing at least one of the problems asked about in the survey (Figure 16), a similar proportion to Wave 1 residents. The most common issues reported by residents were the cost of heating their home to a comfortable temperature (63%), draughts (62%), and condensation or steamed up windows (57%), as well as mould or mildew (55%) and damp in their homes (45%). Half (51%) reported having difficultly heating their home to a comfortable temperature even with the heating on.

[51] Evaluation questions addressed in this chapter: 5.4, 5.5, 5.6, 5.7 and 5.8.

Figure 16: Issues that residents were experiencing in their homes prior to installation of energy saving measures under Wave 2.1



Source: Wave 2.1 Resident Survey. E1. Did/do you currently have any of these problems with your home? Base: All residents (1,867).

Although asked to recall problems before measures were installed, residents living in homes where works had been completed were less likely to report all but two of the problems listed in the survey. Around half (52%, n=456) of those with all works completed reported that it was too expensive to heat their homes to a comfortable temperature before receiving measures, compared to 63% (n=388) of those with works ongoing and two thirds (68%, n=1,019) of those in homes where works had not yet started. Similarly, only 44% reported problems with mould or mildew prior to installation compared to 60% of those with works ongoing and 58% of those in homes where works had not yet started. It cannot be established whether they were not remembering problems that have now been resolved or were misinterpreting the question to refer to their home currently.

In the qualitative interviews, residents were asked how they felt about their homes at the time of the interview (which could be pre or post installation for different residents). While many residents expressed positive feelings towards their homes, mentions of damp and mould were not uncommon. Several residents mentioned having reported the problem to their landlord, explaining that any attempts to fix the issue tended to be temporary solutions (such as cleaning walls and repainting), and that the mould would often return.

> *“The landlord sent someone a year and a half ago. They scrubbed the walls, painted it, but as soon as they painted it the mould started to come up again. I have done it two or three times [since] but you just give up with it and I bought paint that was anti-mould.” Resident*

There was a smaller group of residents who were very happy with their homes and had not experienced any major issues during their tenancy. However, as reflected in the survey findings, even those who felt generally positive about their homes did mention one or two minor issues, such as draughts.

A few residents who had had works completed on their home reported that issues with damp and mould had improved since energy saving measures had been put in place.

> *“[Before the works] the house was riddled with mould, with gaps in the windows and doors. It was not a nice place. But since they have begun the work it is a lot better.” Resident*

Health issues

Of the 63% of surveyed residents who felt that their home was too expensive to heat before the works began (n=1163), three in four felt this was having a (slightly or very) negative effect on their physical and mental health (76% and 75% respectively), of which one third reported it had had a very negative effect on their physical health (39%) or their mental health (38%). This is a larger proportion than was recorded at Wave 1, where 63% reported slightly or very negative effects on their physical health, and 59% on their mental health.

Residents living in homes where works had not yet started were more likely than those with works completed to report negative effects on their mental and physical health due to the cost of heating their home before measures had been installed (78% (n=685) reported a slightly or very negative effect on their physical health compared to 71% (n=239) of those with works completed, and 78% reported a slightly or very negative effect on their mental health compared to 71% of those with works completed).

The consequences of poorly heated homes were reflected in some of the qualitative interviews, particularly for residents with pre-existing health conditions:

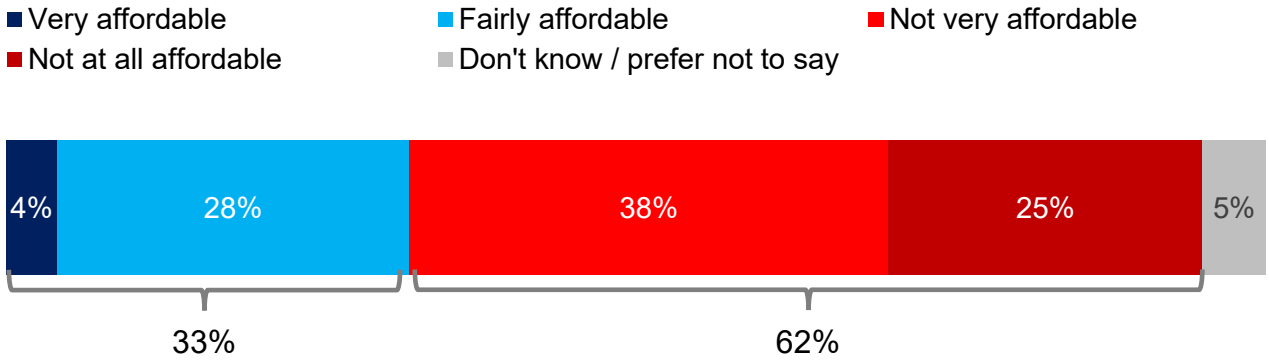
> *"I've lived there now for 11 years in October, and we've had constant damp and mould problems which has affected not only my health, but also my two sons as well, because we've got asthma." Resident*

Energy bills and usage

Nearly two-thirds (62%) of respondents stated that their energy bills were unaffordable during the 6 months prior to the survey (Figure 17). This rose to 7 in 10 (69%) among those in homes where works had not yet started at the time of the survey, compared to 58% of those living in homes where works were still ongoing, and half (50%) of those in homes where all works had been completed. Although fieldwork took place across different seasons between September

2023 and July 2024, there was no significant difference in the affordability of energy bills reported by residents in the 6 months prior to the survey.[52]

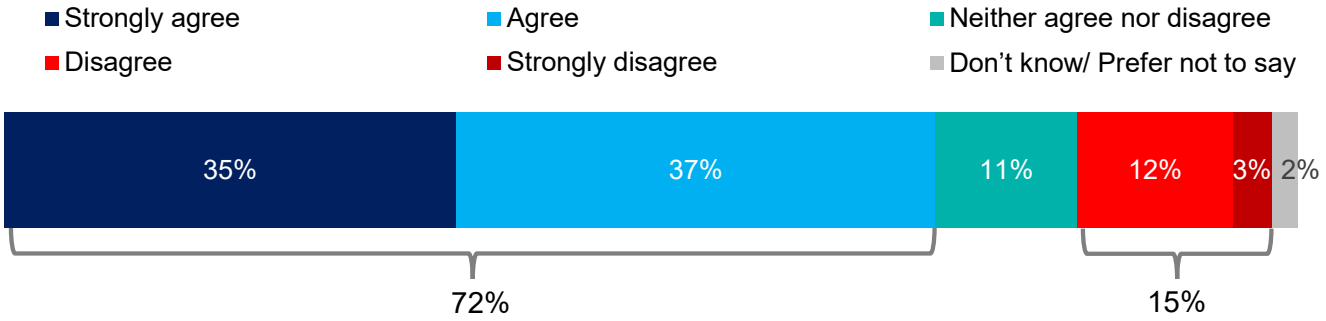
Figure 17: Energy bill affordability among residents taking part in Wave 2.1 during the 6 months prior to the survey



Source: Wave 2.1 Resident Survey. I2 Thinking about the past 6 months how affordable would you say your energy bills are? Base: All residents (1,867).

When asked about their current feelings about heating their homes, about three quarters (72%) of residents either agreed or strongly agreed with the statement "I worry about being able to pay my energy bills" (Figure 18). This proportion was higher amongst those with a long-term health condition or illness (76%) and for those with four to five people in their household (77%). Those in homes where all works had been completed or works were still ongoing at the time of the survey were less likely to worry about being able to afford their bills (67% and 64% respectively compared to 78% among those in homes where works had not yet started).

Figure 18: Agreement with the statement 'I worry about being able to afford my energy bills' among surveyed residents taking part in Wave 2.1



Source: Wave 2.1 Resident Survey. I1 To what extent do you agree or disagree with the following statements? "I worry about being able to pay my energy bills." Base: All residents (1,867).

In interviews, when asked about their experience of paying for energy in the previous year, most residents had noticed considerable increases in the cost of heating their home, especially over the winter. Many mentioned that they monitor closely how much they spend on heating and make efforts to use less energy, often compromising heating their homes to save money.

[52] Fieldwork for the resident survey was conducted in three separate tranches between September 2023 and July 2024. Most respondents took part in tranches conducted in spring and summer of 2024.

> *"I used to have [the thermostat] on at the 17/18 mark, just to take the chill off, and that worked until I got a heating bill and decided I can't do that now, it's too high." Resident*

For some, energy bills had become completely unmanageable over the last year. This was a source of worry for some residents, sometimes choosing between heating their home and other important life costs, with a few mentioning that they were in arrears with their energy provider.

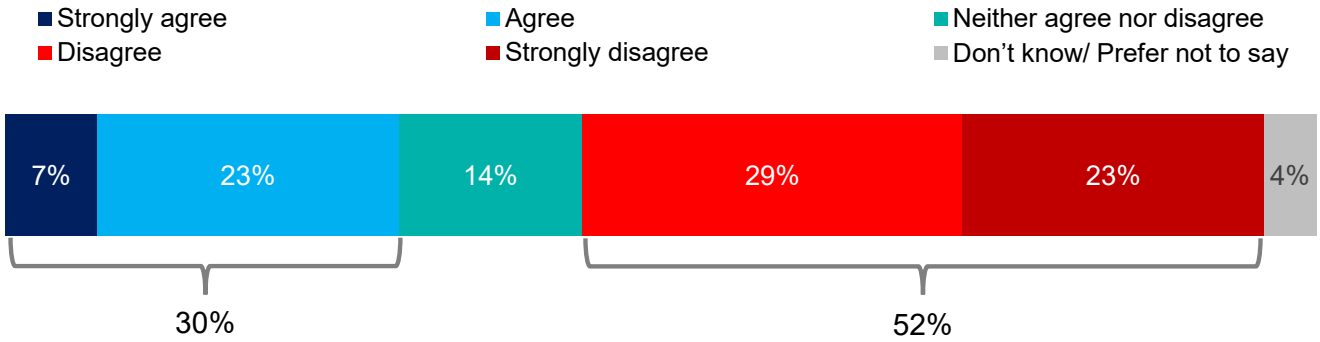
> *"Everything else I seem to keep on track of. The water, the car insurance… but I can't seem to keep up with it the gas & electric. I owe £4,800, and even though I pay £250 a month, it goes down and then I look a week later and there's another £100 added, so I am not getting anywhere with it." Resident*

Among residents who had had at least some works completed in their homes, there were mixed feelings as to whether they had noticed any effect on their energy bills. Some felt it was too early to tell, and others were still concerned about their energy bills rising. However, a few residents who had recently had solar panels installed as part of the scheme had noticed a positive impact on their energy bills.

> *"The panels have made a huge difference to the electricity bill and hopefully they will as well in the winter." Resident*

As shown in Figure 19, less than a third (31%) of residents agreed or strongly agreed with the statement "My home is warm and comfortable even when it's cold outside". Residents whose works had started or completed at the time of the survey were more likely to agree with this statement (43%, n=844) compared to those in homes where works had not yet started (20%, n=1,019).

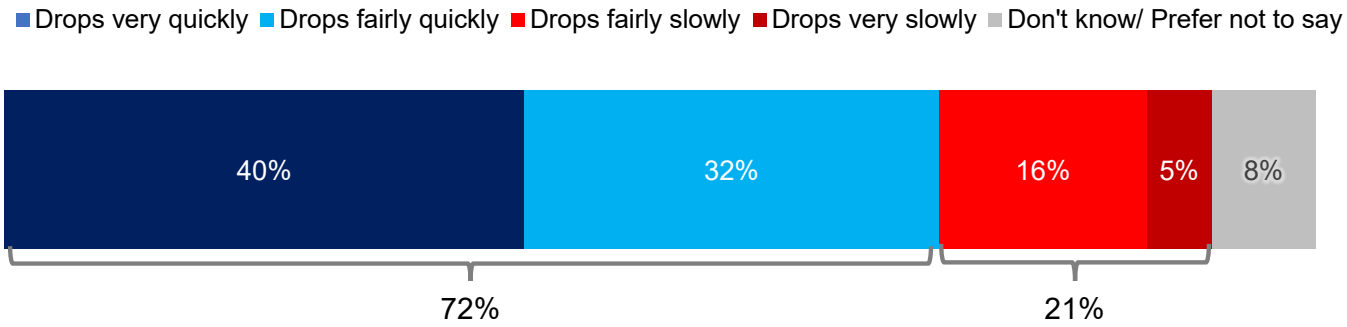
Figure 19: Agreement with the statement 'My home is warm and comfortable even when it is cold outside' among surveyed residents taking part in Wave 2.1



Source: Wave 2.1 Resident Survey. I1 To what extent do you agree or disagree with the following statement? "My home is warm and comfortable, even when it's cold outside." Base: All (1,867).

As shown in Figure 20, residents were also asked to describe how the temperature of their homes drops or reduces within the first two hours of turning off their heating. Three quarters (72%) responded that the temperature drops quickly, while one in five (21%) said the temperature drops slowly.

Figure 20: Rate at which home temperature drops when heating is turned off among surveyed residents taking part in Wave 2.1



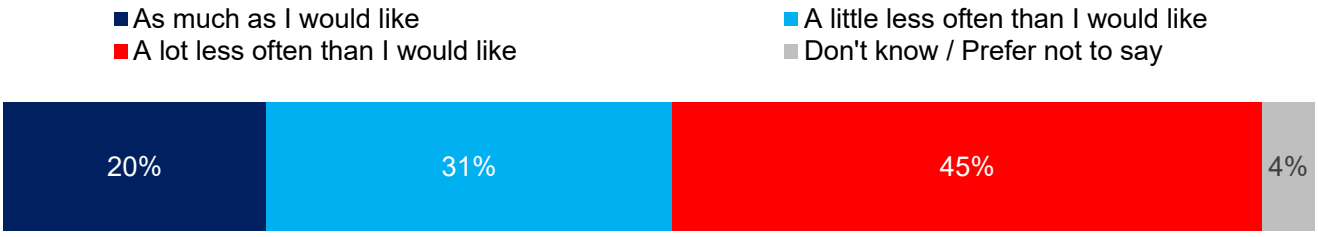
Source: Wave 2.1 Resident Survey. I4 When you switch the heating off, which of the following best describes how the temperature drops (or reduces) within the first two hours? Base: All residents (1,867).

In interviews, around half of the residents interviewed mentioned that their home was cold, particularly in the winter, with a relatively small proportion saying that their home was a comfortable temperature all year round. References to the poor heat retention of residents' homes were common, with many saying that the temperature drops quickly after the heating is turned off. A few reported that the heating had to constantly be on for the house to be warm. This was a problem for some residents who were reluctant to put the heating on for long periods of time to counteract this, due to the cost implications.

> *"The heat loss (in the winter) is so great that we avoid using the central heating because of the cost. So now we use electric storage heaters just in the room that we are in." Resident*

When residents were asked if they use their heating as much as they would like when it is cold outside, three in ten (31%) said they use their heating a little less often than they would like, and just under a half (45%) said they use it a lot less often than they would like, totalling 76% of respondents. Only 20% of respondents use their heating as much as they like to (Figure 21).

Figure 21: Use of heating when it is cold outside among surveyed residents taking part in Wave 2.1



Source: Wave 2.1 Resident Survey. I3 When it's cold outside, do you use your heating as much as you would like, or less often than you would like? Base: All residents (1,867).

Those in homes where all works had been completed or works were ongoing at the time of the survey were more likely to use the heating as much as they liked when it's cold outside compared to those in homes where works had not started (25% (n=456) and 23% (n=388) respectively compared to 16% (n=1,019)).

Those who reported poor physical health were more likely to use the heating a lot less often than they would have liked compared to those in good physical health (49% (n=562) compared to 37% (n=658)). Similarly, those with a long-term health condition or illness were more likely to use the heating a lot less often than they would like when it's cold outside compared to those with no health conditions (47% (n=1,240) compared to 39% (n=515)).

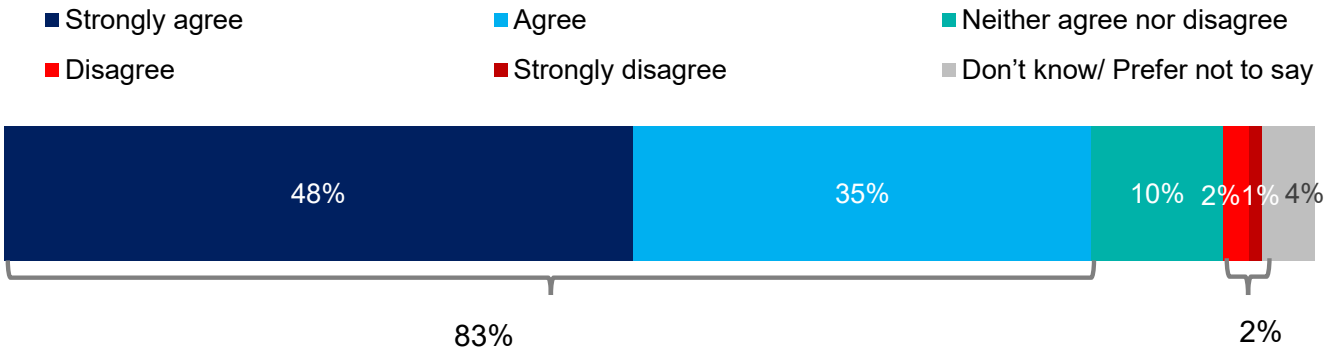
Resident views on energy efficiency and climate change

Most of the residents in the survey and interviews were interested in improving the energy efficiency of their home, often motivated by saving money on energy bills and the health benefits linked to a well-insulated home.

Interest in energy efficiency

Most residents were interested in improving the energy efficiency of their home (83%; see Figure 22). Interest was higher among residents in homes where works had not yet started (85%, n=1,019), or where works were ongoing (85%, n=388) compared to those whose installations had been completed (77%, n=456). Ten percent of residents neither agreed nor disagreed that they were interested in improving the energy efficiency of their home, and very few (2%) disagreed.

Figure 22: Agreement with the statement 'I am interested in improving the energy efficiency of my home' among surveyed residents taking part in Wave 2.1



Source: Wave 2.1 Resident Survey. J2. To what extent do you agree or disagree with this statement: 'I am interested in improving the energy efficiency of my home'? Base: All residents (1,867).

Similar to findings in Wave 1, in interviews many residents said that saving money on bills was the primary reason for residents' interest in energy efficiency, especially in the context of rising energy costs. Other motivations included health concerns, with some residents emphasising the health benefits of a well-insulated home, and a general desire to reduce their carbon footprint.

> *"Well, I think that we are very lucky to be given these opportunities to have these additional measures on the house, particularly because of the way we feel about energy saving measures and being mindful of the planets resources. Obviously, we are going to jump at the opportunity." Resident*

Despite considerable reported interest in improving the energy efficiency of their homes, most interviewed residents were unaware of their home's EPC rating, including those who expressed a strong interest in energy efficiency.

Interest in climate change

In interviews, residents were also asked about their level of interest in climate change, and the things that they do to reduce their carbon footprint. Interest in climate change was widespread among interviewed residents, with many referring to it as one of the most pressing issues facing society today. Many residents showed strong levels of interest in climate change, particularly due to concerns about the future for their children and grandchildren.

> *"I am very interested in climate change, I think more than anything else the fact that I have children - I want their future to be secure and that is a bit of a worry." Resident*

Another sizable group of residents interviewed expressed moderate interest in climate change, though they prioritised other concerns such as financial stability and the health of loved ones.

> *"It's not that high on my agenda, the cost of living is right at the top of my agenda. I understand this is a future thing [climate change] but unfortunately I'm living in the here and now." Resident*

When asked about the measures that they take to reduce their environmental impact in their home, residents mostly reported making an effort to reduce their electricity usage by turning lights off when leaving a room and unplugging devices when not in use.

8 Conclusions

This chapter considers the key enablers and barriers affecting the successful design and delivery of Wave 2.1, synthesising evidence presented in this report.

Summary of delivery

A total of 107 projects successfully applied for Wave 2.1 funding, with £777 million awarded. These bids targeted 94,096 properties, around 2.3% of all social rented housing in England. Loft Insulation and Ventilation were the most common measures planned to be installed, with Clean Heat measures planned for 10% of properties targeted.

With Wave 2.1 commencing in April 2023, 42% of projects had reported that installations had commenced[53] and 6,519 properties had had measures installed as of the end of July 2024. Mobilisation therefore has been relatively slow (and slower than in Wave 1), and the number of properties receiving installations each month has slowed since early 2024 to some extent, although delays in reporting by projects (and the incentive for reporting presented by the end of the 2023/24 financial year) obscures the overall trend.

Relatively slow progress in part reflects that SHLs were given a longer delivery window for installations given the increased targets relative to Wave 1. Nevertheless, this shortens the remaining time available for completing installations and increases the risk that not all planned installations will be completed by September 2025, the anticipated end date for Wave 2.1. Some projects have descoped their work, with the latest project plans from July 2024 indicating that they have installed or plan to install measures in 87,811 properties, 7% fewer than in bids.

Positively, nearly all properties with completed installations (99%) had a post-installation EPC rating of A to C, compared to just 2% of properties prior to receiving the installation. From a financial perspective, it is relatively early in the process to assess delivery costs, however the evaluation's indicative assessment is that costs have been slightly higher than planned for (especially for some insulation measures).

Enablers and evidence of successful design and delivery

The design of Wave 2.1 drew effectively on learnings from the Demonstrator and Wave 1. This included changes to the eligibility requirements and the application process, including:

- **Extending the scheme to a wider pool of landlords**, in particular those covering vulnerable residents.
- **Early publication** of Wave 2.1 competition guidance.

[53] Using a combination of SHDF project summary monitoring data and property-by-property delivery data. This is likely to be an underestimate due to projects sending delivery data late; see discussion at Figure 4 and Figure 6.

- **Application forms made easier to complete** for consortia, and application windows made longer.
- **Delivery timescales lengthened**, thus enabling more properties to have measures installed.

These improvements – alongside the sector's familiarity with the scheme following Wave 1 – contributed to a large number of bids made from a range of SHLs (although not necessarily the expected full range of SHLs, as explored in the next section). Scheme delivery representatives also felt that the quality and ambition of the applications was relatively high. A range of factors contributed to their quality, including:

- **SHLs having greater knowledge of their stock** compared to Wave 1 applications e.g., following investment in stock data software.
- **The application support provided through the SHRA** and in particular the face-to-face meetings with larger landlords, which helped raise their ambitions in terms of the volume of properties to target.
- **Applications were rigorous in terms of planned costs and factored in inflation**. This is backed up – so far – by the actual costs of measures, with the Change Control data indicating that installation costs are in line with, or slightly higher than, the planned costs for measures in bids. The costs in bids line up closely with actual costs at Wave 1, indicating lessons learned among SHLs and retrofit co-ordinators.

Furthermore, successful bids on average achieved 59% match funding, considerably higher than the minimum requirement of 50%, thus increasing the efficiency of the Wave 2.1 funding. Typically, SHLs reported that the Wave 2.1 funding provoked significant additional installation activity. While some of the landlords interviewed would have continued to install energy efficiency measures, they would have done so more slowly, less intensively, and to lower quality standards.

One new element of the scheme management process was the introduction of the DA, a new role that provided a layer of oversight between DESNZ and the DP. While the approach to scheme management had some positive features (for example, project monitoring was generally considered successful in terms of identifying and preparing for risks, and supporting contractual changes), there were several issues affecting scheme management, as outlined in the next section.

There is moderate evidence to suggest that the design of Wave 2.1 has contributed to cost savings during the installation process. This has occurred – according to supply chain stakeholders – primarily due to efficiencies gained from a large number of properties identified for treatment within a confined geographical location. An initial assessment of the installation costs data corroborates this, with substantial economies of scale on measure costs occurring among larger projects, although it also found that administrative costs were higher among consortia.

In line with Wave 1, the evaluation demonstrated that projects are targeting residents in need of support with their property: more than 9 in 10 (91%) surveyed residents reported issues with their property prior to the installation, including facing draughts, difficulty heating their home to

a comfortable temperature, and damp. Indeed, thermal comfort and energy bill affordability were the most common motivations for residents agreeing to the works being done, as opposed to environmental factors.

SHLs did not consider that resident refusal to participate was a common barrier to works being undertaken. However, a lack of engagement once they had agreed to the works caused issues and delays; for example, some residents were reluctant to provide access to their property at times when installers needed to visit. The key enablers to maximise resident engagement were the nature and content of communication and the level of staff involvement for resident liaison purpose, especially social housing landlords and installers providing clear and up-to-date information on the timescales of the works.

Similarly to Wave 1, most surveyed residents whose installations had completed were satisfied with the installation process and with the outcome of the measures. This suggests that the PAS 2035 quality standards requirements are helping to facilitate high quality installations for the majority of residents.

Barriers to successful design and delivery

While the Wave 2.1 design drew on learnings from the Demonstrator and Wave 1, the evaluation identified some aspects of scheme design that negatively impacted the application process and delivery. These included:

- Some (successful and unsuccessful applicant) **SHLs considered that the administration and ancillary costs were set too low** for the amount of work that needed to go into the Wave 2.1 project preparation and first stages of delivery.
- Several applicants interviewed saw the **requirement of reaching an EPC rating of C on homes with measures installed as a limitation**. In some cases, this limited the stock that was eligible for installation (but still required work), while, in other cases, SHLs wanted to upgrade the stock to an EPC rating of B or A, but felt disincentivised from doing so. Cost caps for clean heat measures in particular were deemed to have been set too low by certain social housing landlords.
- Despite the longer delivery timeframe of Wave 2.1 relative to Wave 1, some applicants still felt that **the timeframe was a barrier to applications**, in part due to a shortage of qualifying contractors and supply chain stakeholders, and the timing of the Wave 2.1 application coinciding with that of the Home Upgrade Grant.

The scheme successfully attracted a large range of bids from applicant SHLs. Nevertheless, scheme delivery representatives noted a lack of clarity on which segments of the market did not submit applications and why. The proportion of funding allocated to consortia did not increase in Wave 2.1 compared to Wave 1, and this may explain why (as at Wave 1) housing held by smaller SHLs was less likely to be included in the scheme than housing held by larger SHLs. Several SHLs in interviews noted a likely advantage for larger organisations, due to internal resource availability for bid completion.

To date, the scheme has suffered from the slow delivery of installations. There have been a number of factors contributing to this, including:

- **Delays in the mobilisation of the DA and DP** (e.g., a large minority of kick off meetings were held as late as July 2023, when the funding was allocated in April 2023).
- The efficiency of the scheme management process; **many stakeholders mentioned that the DP needed support from DESNZ staff, which slowed down decision-making**, in part due to a lack of knowledge regarding the retrofit process or SHLs' particular situations. This is consistent with Wave 1. A high turnover of staff within the DP also contributed to this.
- It took **more time than anticipated for SHLs to procure sub-contractors**, with issues relating to scheme management (e.g., the DA/DP mobilisation) having knock-on impacts for arrangements between SHLs and their supply chain.
- **Retrofit assessments** pre-installation, and the design stage more generally, **took longer for projects than initially anticipated**.
- **Lack of accurate assessments on properties planned to have measures installed**. Several projects reported that properties required more remedial works than anticipated and this is reflected in change control applications moving activity and costs into enabling works.
- **Resource challenges among the supply chain**, with the need for Trustmark accredited companies and PAS 2035 compliant installers limiting the pool of available workers and companies. This has been exacerbated by a number of concurrent government retrofit schemes that have similar requirements. One potential limitation is that SHLs have typically relied on established relationships they have with the supply chain to undertake the Wave 2.1 installations, with only moderate evidence of them engaging new suppliers.

An additional issue with the scheme management process (albeit not one that appears to have affected delivery) were monitoring data requirements for SHLs. Monitoring data provided by SHLs on a monthly basis can often be patchy or late, with SHLs citing issues around the resource they have to comply with this requirement, and challenges in using a form that offers little flexibility. This continues the trend in Wave 1, where SHLs considered monitoring requirements disproportionate to the size of funding allocated.

A key risk for a majority of projects has been cost inflation (the latest risks data showed that 43% of projects reported it as a serious issue). SHLs encountered higher costs of both labour and materials, which was attributed to a variety of 'external' factors such as the UK's exit from the EU and COVID-19, as well as issues with labour supply (caused in part by Wave 2.1 quality requirements). Furthermore, in order to meet the quality standards required, there was typically a larger than anticipated number of return visits to properties.

In responding to timetable delays and cost inflation, some projects have descoped their project plans. Descoping resulting from high costs has often led SHLs to focus on properties that are easier to retrofit, such as bungalows or houses as opposed to flats, as well as installing lower

cost measures, such as windows and doors instead of EWI. Indeed, cost inflation was the most commonly reported severe risk by projects. Delivery data suggested this was not mainly due to inflation in core measure costs (although some occurred, e.g., +17% for EWI) but due to increased scope of enabling works.

As discussed earlier in this chapter, residents were typically positive about their experience of the installation process. However, more negative reflections on their experience included:

- **As in Wave 1, over a third of surveyed residents thought they had no choice about whether the works would go ahead**. Therefore, while it was positive that SHLs suggested resident refusal was a rare concern, this may be caused by a lack of awareness among residents that they could opt out. Older residents in particular were more likely to state this.
- **Communication from both SHLs and installers was generally considered by surveyed residents to be quite poor**. Residents wanted clear information about what exactly was planned and when the plans would go ahead, and this appeared to be lacking particularly in the early stages of the installation process.
- Among residents who had had at least some works completed in their homes, there were **mixed perspectives as to whether they had noticed any effect on their energy bills**. Some felt it was too early to tell, and others were still concerned about their energy bills rising.

Wave 2.1 design has successfully built on learnings from the Demonstrator and Wave 1, reflected in the large number of high-quality applications received from SHLs. The delivery of Wave 2.1 installations has been slow, however, creating the risk that delivery timescales will need to extend beyond September 2025. This could add to the cost inflation concerns that projects consistently report as being the most severe risk to delivery. The requirement to comply with PAS 2035 continues to enhance the quality of retrofit installations but contributes to resourcing challenges the supply chain faces. Finally, residents' experience of the scheme has generally been positive, although there is evidence to suggest communication from landlords and installers could improve.

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