UK Government

Social Housing Decarbonisation Fund, Wave 2.1

Process Evaluation Report: Technical Annex

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

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1 Evaluation overview

1.1 Introduction

This is the technical annex for the Wave 2.1 process evaluation report (the first of two externally commissioned Wave 2.1 evaluation reports). An impact evaluation report for Wave 2.1 will be published separately in 2026.

The process evaluation for Wave 2.1 of the Social Housing Decarbonisation Fund (SHDF, 'the scheme', now replaced by the Warm Homes: Social Housing Fund, or WH:SHF), aimed to address four evaluation questions[1] for Wave 2.1:

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 previous waves (Wave 1 and the Demonstrator) and other energy efficiency schemes funded by the Department for Energy Security and Net Zero (DESNZ) 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?

1.2 Methodological approach

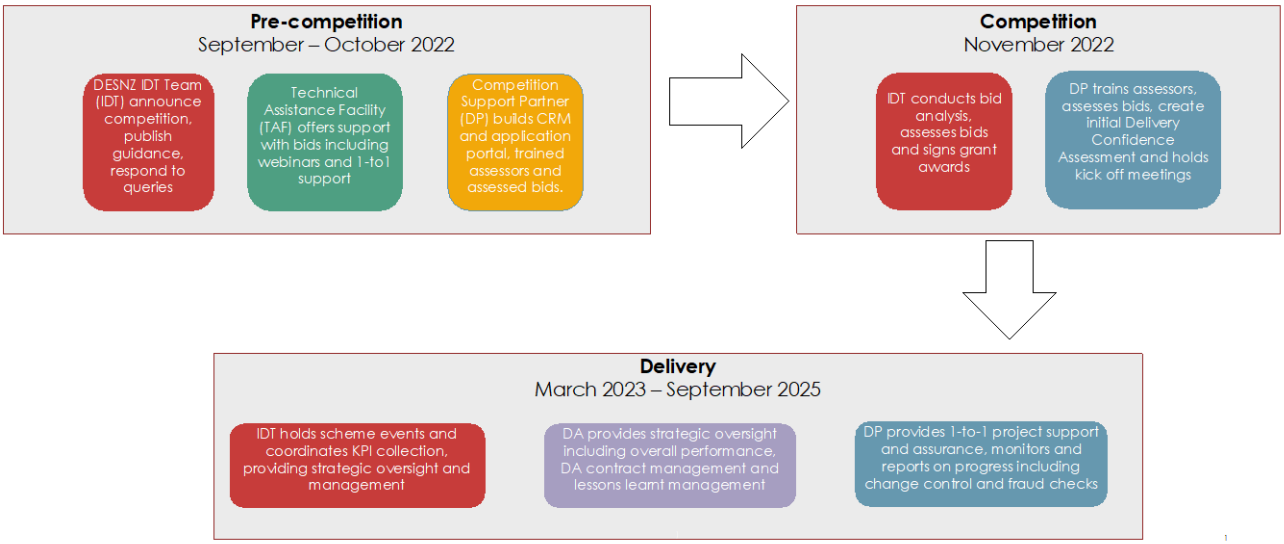
The Wave 2.1 process evaluation takes a mixed methods approach. The evaluation draws on surveys and interviews with stakeholders and beneficiaries, secondary data, and synthesises findings against process evaluation questions.

In an initial scoping phase, the evaluation team first developed a Theory of Change (ToC), from which evaluation questions and a methodological approach, incorporating both primary and secondary data, was established. As part of this, the evaluation team engaged an expert panel to provide scrutiny and quality assure the approach.

The processes covered in the evaluation are summarised in Figure 1 below. Available data sources were mapped to the detailed evaluation questions in a separate spreadsheet.[2]

[1] Detailed evaluation questions are available in 3. Detailed Evaluation Questions
[2] Available here.

Figure 1: Wave 2.1 key processes and relevant organisations



The following data sources were drawn upon extensively to address the process evaluation questions:

- Resident survey and interviews
- Interviews with supply chain representatives
- Interviews and focus groups with Social Housing Landlords (SHLs)
- Interviews and focus groups with staff representing DESNZ senior management and the Integrated Delivery Team (IDT) team, the Delivery Partner (DP) and Delivery Agent (DA), and the Technical Assistance Facility (TAF)
- Secondary data, including application and scheme monitoring data

These are discussed in more detail in other sections of this technical annex. The evaluation also incorporates case studies to explore projects and themes of particular interest. More details on these are provided in the next section.

1.3 Case study approach

Overview

Case studies are a central part of the Wave 2.1 evaluation. Their purpose is to provide an in-depth examination of key projects and themes. Six project-based case studies and three thematic case studies are being developed for the Wave 2.1 evaluation. Case studies were used for sampling SHLs, residents and supply chain stakeholders for interviews and focus groups, as described separately in other sections of this annex.

Selection of case studies

Six Wave 2.1 projects were selected to be case studies for the process evaluation:

1. Peabody Trust
2. Sanctuary Housing Association
3. Greater Manchester Combined Authority
4. Colchester Borough Council
5. Haig Housing Trust
6. Flagship Homes

The process for selecting case studies began by creating a shortlist of projects meeting a number of priority areas for developing further understanding of them. These shortlisted projects were then checked in line with other criteria to ensure there was good representation of a range of project characteristics. The final selection of case study projects was agreed with DESNZ. Initially, West of England Combined Authority or Birmingham were provisionally selected to be a case study, but due to the timing of the research strands and internal capacity issues they were removed and replaced with Flagship Homes.

The Wave 2.1 project-based case studies are intended to be longitudinal. Project teams and partners are being consulted at three points during delivery in order to provide an in-depth overview of project delivery over the Wave 2.1 lifecycle. The data collected in the first two tranches of project interviews has been used to inform the Wave 2.1 process evaluation, though the case studies will not be developed until after the third tranche of data collection.

For the three thematic case studies, Technopolis suggested some initial ideas for themes to explore. These ideas would bring additional value rather than duplicating core analysis already being undertaken for the process, impact or economic evaluations. One of the thematic case studies was produced to inform the Wave 2.1 process evaluation, which is focused on the Technical Assistance Facility (TAF) Bridge. The remaining two case studies will be produced at a later date to inform the Wave 2.1 impact evaluation and will focus on:

- Projects that received digitalisation funding.
- Projects that installed clean heat measures.

Case study reporting

Project-based case studies will be written up as concise, self-contained reports. Case studies will draw upon a wide variety of data sources including secondary delivery data and primary data collected with SHLs, residents and supply chain stakeholders.

2 Theory of Change

The ToC describes the aims of Wave 2.1 and the processes by which the inputs and activities are expected to lead to outputs, outcomes, and benefits. Developing a ToC is a key first step of any evaluation, as it sets out an agreed understanding of what outcomes are expected and necessary to assess success of the scheme in question. The ToC was used to develop evaluation questions and a methodological approach, incorporating both primary and secondary data.

The process evaluation focuses on the inputs, activities and outputs of the ToC. Where emerging evidence was available, some early analysis of relevant outcomes was conducted and findings included in the report (as detailed in Section 3: Detailed Evaluation Questions). The impact evaluation will use Contribution Analysis to assess Wave 2.1's contribution to outcomes and impacts, including assessment of energy savings.

The overarching ToC, and the different causal pathways captured within, are presented in detail in sections 2.1 to 2.6 below.

2.1 Wave 1 and Wave 2.1 rationale and objectives

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 scheme 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, 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.

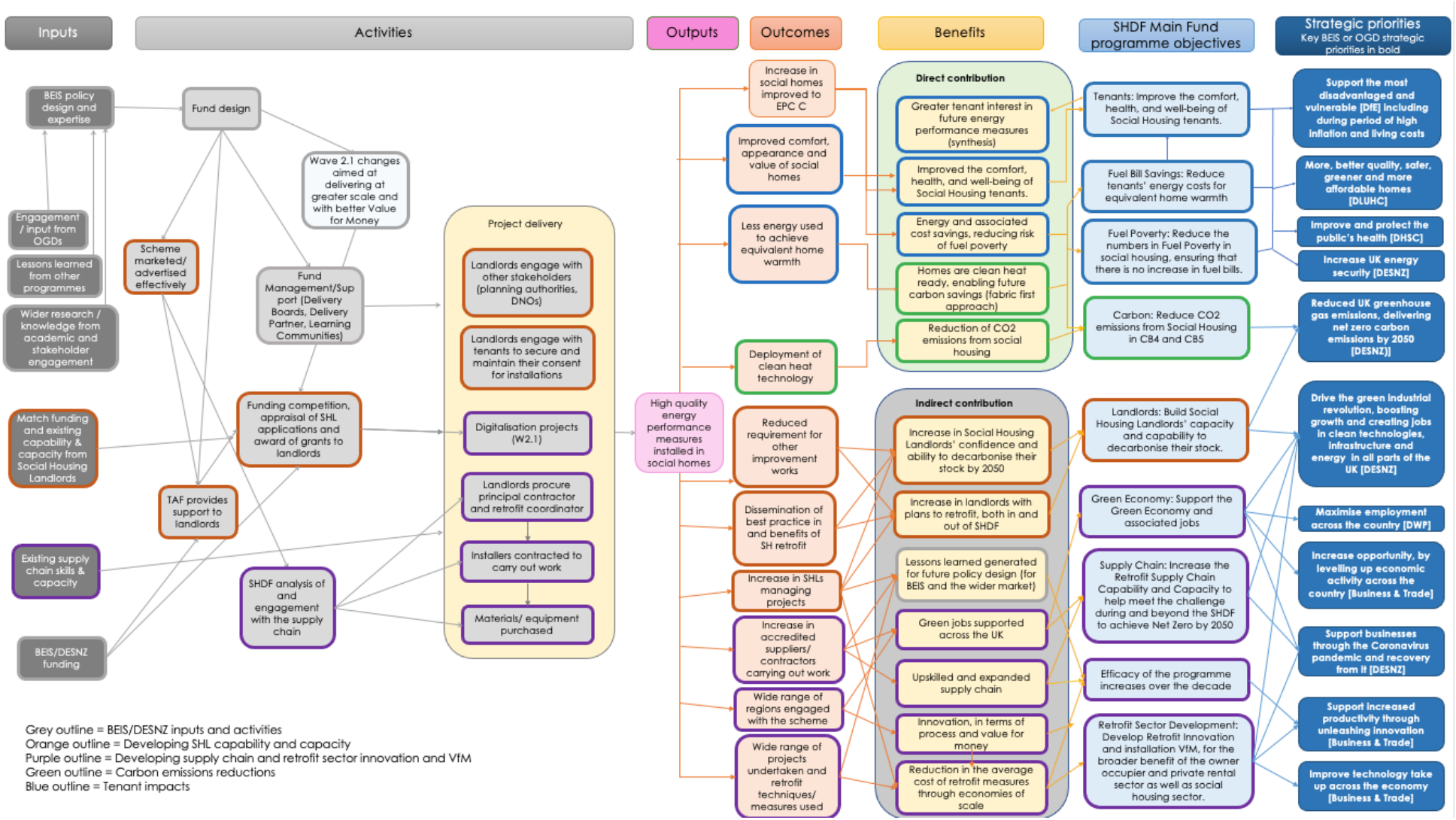
The investment will see SHLs improve the energy performance of their properties through the installation of energy efficiency measures and low carbon technologies. This is expected to have a positive impact on residents' lives, reducing bills, improving thermal comfort, and reducing the number of residents in fuel poverty. It is also expected to help build capability in the supply chain and social housing sector, developing knowledge and capacity to deliver social housing retrofit and beyond. The first two waves (Wave 1 and Wave 2.1) are the focus of this evaluation.

The objectives of both waves are:

- Reduce CO_2 emissions from social housing in Carbon Budget (CB) CB4 and CB5.
- Improve social homes to Energy Efficiency Rating (EER) C.
- Reduce the numbers of social housing residents in fuel poverty, ensuring that there is no increase in fuel bills.
- Improve the comfort, health, and well-being of social housing residents.
- Develop the green economy and associated jobs.
- Develop retrofit innovation and installation value for money (VfM), for the broader benefit of the owner occupier and private rental sector.
- Increase the retrofit supply chain capability and capacity to help meet the challenge during and beyond the scheme, to achieve Net Zero by 2050.
- Build SHLs' capacity and capability to decarbonise their stock.

The logic models presented below set out the pathways through which impacts are expected to be achieved against Wave 1 and Wave 2.1 objectives. The narrative presented in the sections below describes this in detail.

Figure 2: Overarching logic model



2.2 Government inputs and activities: funding, design and management

The following section describes the government inputs and activities that contribute to Wave 1 impacts.

Government inputs

DESNZ allocated £800 million for Wave 2.1, using Section 31 of the Local Government Act to provide funding. The other principal government input was the policy design and expertise of DESNZ. This was supported by engagement with and input from other governmental departments, lessons learned from previous waves (the Demonstrator and Wave 1), other domestic energy efficiency schemes, and wider research and knowledge from academics and other stakeholders.

Government activity: Wave 2.1 design

Key features of the scheme design and their rationale are described in turn below.[3]

Co-funding requirement and applicant eligibility

A co-funding requirement was set up for Wave 2.1 to establish accountability and ownership of projects among SHLs as well as to add to the scale of installations undertaken. SHLs were responsible for bringing in a minimum of 50% of the required funding in Wave 2.1, up from 33% at Wave 1. Applications could be led by a Combined Authority (CA), Local Authority (LA), Registered Provider (RPs), or by a charity not registered with the Housing Regulator. All of these types of organisations could also apply as part of a consortium bid, and arms-length management organisations (ALMOs) could join consortia even if not registered providers themselves.

Eligibility and prioritisation of properties to be retrofitted and high-quality measures to be installed

SHLs were expected to take a fabric first approach to installations to improve properties to Energy Performance Certificate (EPC) C, or EPC D, where EPC C was not possible, for properties which were originally at EPC F or G. Wave 2.1 used cost caps which, unlike at Wave 1, were scaled by wall type and were also higher for properties not on the gas grid receiving low carbon heat measures. This was intended to target funding at these properties which represented value for money to the scheme.

Eligible measures under Wave 2.1 included a range of measures (e.g., insulation of all types) to increase heat retention in homes, as well as solar panels and low carbon heat (to contribute to carbon emissions reductions). The scheme funded low carbon heat on the basis that

[3] DESNZ (2022) *Social Housing Decarbonisation Fund Wave 2.1: Competition Guidance.* September 2022.

projects would take a fabric first approach, and so the full suite of measures for an individual property would reduce bills as well as providing carbon savings.

In their bids, projects were allowed to include some mixed tenure properties. This was to enable retrofitting of social housing where in fill properties were present. Over 70% of properties in the bid had to be social housing.

In order to ensure quality of work and reduce the risk of poor performance and limited achievement of energy and carbon savings, as for Wave 1, measures had to be installed in line with PAS 2035 and installers had to be Trustmark accredited or equivalent.

Delivery window

The delivery period for Wave 2.1 was intended to be two years ending in April 2025, up from 12 months at Wave 1. Projects are permitted to use their co-funding to extend delivery to September 2025.

Technical Assistance Facility (TAF)

The inclusion of a SHRA (Social Housing Retrofit Accelerator), operated by the TAF (Turner and Townsend), in the bid stage was intended to provide support to SHLs in pre-competition stage through information and workshops to enable them to develop effective project plans and bids (as discussed in more detail in later sections).

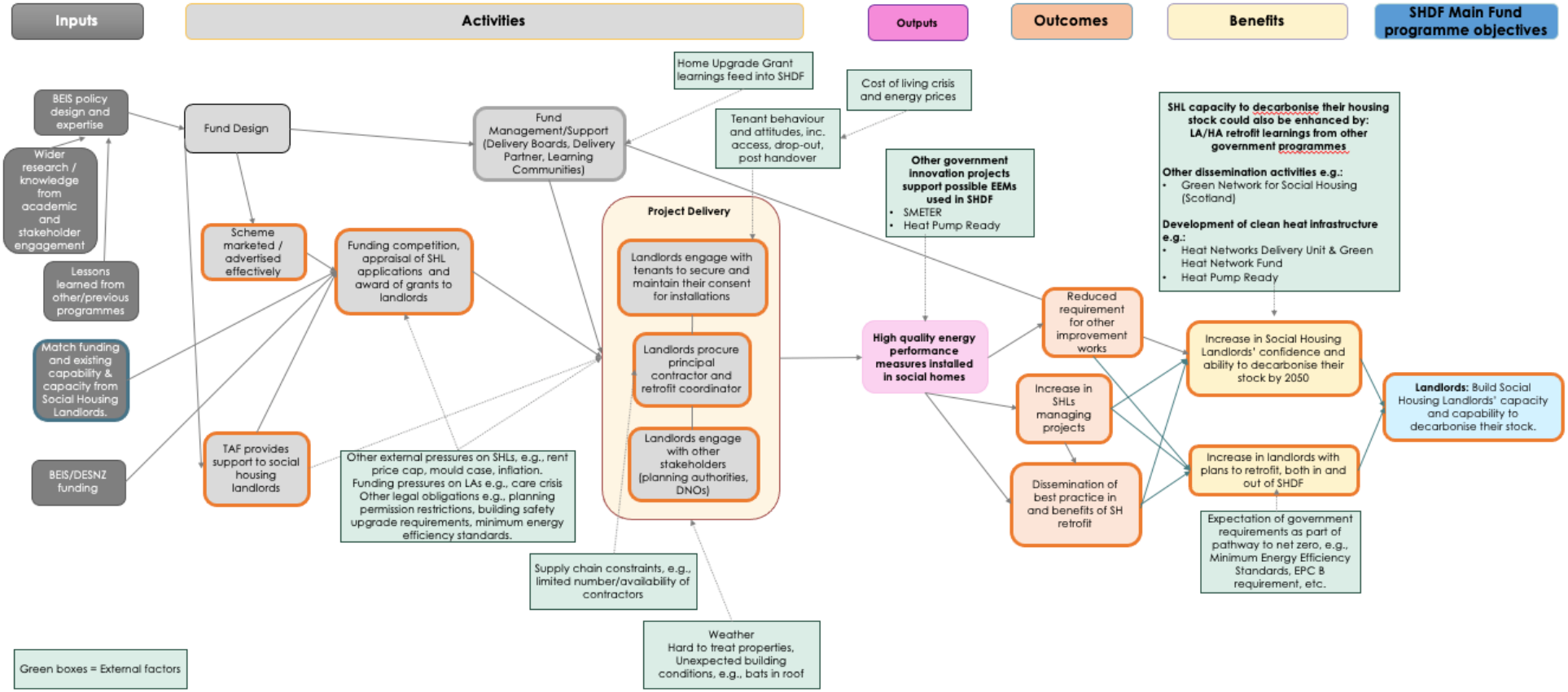
Government activity: Wave 2.1 management

Scheme management and support activities for SHLs were key aspects during the set up and delivery phase of projects. Scheme management included DESNZ's Integrated Delivery Team (IDT), the Delivery Agent (DA), and the Delivery Partner (DP). The IDT was in charge of decision making on change control and milestone payments at the DESNZ level. The sub-contracted DA was introduced in Wave 2.1 to support the IDT with contract management and administration. The DP is an externally sub-contracted provider which leads regular day-to-day engagement with projects, and communicates progress to DESNZ, identifying underperformance, providing inputs to and assurance of critical project decisions, and building action plans where things went wrong. The inputs of all these bodies and the processes they delivered were intended to support successful execution of projects thereby enabling achievement of impacts in an efficient manner.

2.3 The pathway to building SHL capacity and capability to deliver retrofit projects

A key objective of Wave 2.1 was to increase the capacity and capability of SHLs in decarbonising their housing stock. This section describes inputs and activities that are part of the causal pathway related to intended impacts of increasing capacity and capability of SHLs (Figure 3).

Figure 3: Building SHL capacity and capability to deliver retrofit projects



SHL Inputs

Co-funding from SHLs was a key input for Wave 2.1 (minimum 50% of total project costs).

Assumption: SHLs are able to secure the minimum co-funding necessary to apply for bids and carry out retrofits.

External Factor/Risk: SHLs face competing priorities and fiscal pressures which may decrease the budget available for energy performance retrofits. These include statutory and legal obligations such as building fire safety and other ongoing maintenance requirements and investment in the development of new housing stock. SHLs also face ongoing fiscal pressures arising from the economic context and high inflation. In particular, LAs have a wide range of other competing priorities not related to housing.

External Factor/Risk: Inflation, rising material costs, and unexpected maintenance needs or preparatory work needs during project delivery may increase project costs. The DESNZ funding input is fixed and SHLs may have insufficient additional budget to meet unanticipated costs.

Activities involving SHLs

Scheme marketing was an important activity to drive participation and support the formation of strong bids for Wave 2.1. Wave 2.1 included a significant launch/mobilisation event to alert and inform potential SHL bidders about the competition. Competition guidelines were published on the Government website. Marketing and engagement activity consisted of a five-tiered approach to SHLs, based on level of potential interest. Lessons from Wave 1 and other government programmes guided Wave 2.1 engagement and marketing activities, including more targeted and tailored support and network/consortium-building activities. Both the TAF Bridge (discussed below) and consortium partnerships supported SHLs in identifying suitable homes for retrofit and modelling.

Risk: Marketing and engagement activities do not reach enough SHLs or the appropriate SHLs to produce quality bids.

The **Technical Assistance Facility (TAF) Bridge** provided support to SHLs in pre-competition stage through information and workshops to help build SHL understanding of retrofit and drive more, larger and stronger bids. Topics included retrofit opportunities and technologies, procurement and supply chain engagement, resident engagement, and developing a bid. Lessons from the Demonstrator and Wave 1 further showed the need to support SHLs with information across these domains.

Assumptions: SHLs access and use TAF resources. The support is sufficient and appropriate in building SHL capacity and capability to make successful, high-quality applications.

Risk: Delay in the set-up of TAF Bridge and funding limitations limit the number of potential bidders they can support.

External Factor: SHL capability could be enhanced through shared lessons of energy performance retrofits conducted through other government initiatives e.g., Homes Upgrade Grant (HUG), Green Homes Grant (GHG).

The **Funding Competition** activity was the phase where SHL applications were appraised, and grants were awarded to the best applications. The funding granted through this competition was used by SHLs to plan and commission energy performance installation projects in their housing stock. These were projects which they could not otherwise afford to undertake at the same pace, at the same scale, or to the same level of quality.

Assumptions: Wave 2.1 requirements are sufficiently aligned with SHLs' wider maintenance plans for them to proceed with applications.

Assumption: SHLs have sufficient and accurate data on their stock to develop effective plans for installing energy performance measures via Wave 2.1.

Risk: SHLs have insufficient data and understanding of their stock.

Risk: Bidders have difficulty forming consortia and building trust between different SHLs, leading to fewer and smaller bids with peppered stock (due to mixed tenure) and poor modelling of stock (due to low LA modelling capacity).

Risk: SHLs perceive the policy context as too uncertain to validate the effort and investment of energy efficiency projects. They may also be concerned that future regulation will have different requirements which creates a risk that any earlier work has to be adapted/re-done and is not cost effective. Given that housing decarbonisation is at an early stage, SHLs may also prefer to wait until approaches are more established.

External factor: SHLs may also be motivated to apply to Wave 2.1 because they have internal commitments to reduce their carbon emissions. This addresses Environmental, Social and Governance (ESG) requirements, and/or helps satisfy other objectives such as reducing mould and improving living conditions more broadly.

The **scheme management and support activities for SHLs** (discussed previously) were key aspects during the set up and delivery phase of Wave 1 projects. The DP's role included facilitating lesson learning among participating SHLs, and those taking part in HUG, and dissemination to non-participating SHLs.

Assumption: SHLs engage fully with the DP and opportunities for cross-learning. The support is sufficient and appropriate in building SHL capacity and capability in delivery processes.

Project Delivery

The following describes activities undertaken by Wave 2.1 projects within the delivery phase.

Resident engagement and consent

SHLs engaged with residents to secure and maintain their consent for installations. SHL engagement was undertaken via tenant liaison officers and retrofit coordinators. It drew upon TAF Bridge and DP guidance and lessons learned from the Demonstrator and Wave 1. Buy-in and consent for installation of energy performance measures was achieved because residents understood the potential benefits including reduction in energy costs and improved comfort and property. They saw these as outweighing the potential risks/challenges, for example, disruption of installation and use of new technology.

Assumptions: Residents continue to provide consent for installation of energy efficiency measures because these are organised alongside other maintenance works and/or generally in a way that minimises disruption.

Risk: Resident resistance to works, or difficulties experienced during works, reduces the number of projects moving forward.

External Factor: The cost-of-living crisis could encourage residents to consent to energy performance measures because they expect to save money. However, the crisis could also cause stress therefore increasing residents' resistance to change.

Procurement of a principal contractor and retrofit coordinator

SHLs procured a principal contractor and retrofit coordinator. The Social Housing Retrofit Accelerator (SHRA), through the TAF Bridge, was meant to guide SHLs on the channels and process of contracting retrofit coordinators, with plans in place pre-bid. PAS 2035 guidelines required under the grant also outlined the steps SHLs could expect to undergo through the retrofit process. Once contractors were appointed, SHLs were expected to manage the projects, risks, and delivery with the contractors. The TAF Bridge provided insight into project management prior to applications, and the DP provided ongoing technical support to SHLs. SHLs were expected to develop risk logs and project plans to mitigate issues. The use of a principal contractor added value by bringing together and managing a consortium of suppliers and installers. This reduced the administration and transaction costs for SHLs as they only needed to manage the principal contractor. It also potentially offered economies of scale in coordination of works and improved value for money.

Assumption: The SHRA and DP in-delivery support are sufficient in enabling SHLs to connect with and contract retrofit coordinators.

Risk: The supply chain is not sufficiently developed to meet the needs of SHLs (discussed further in the next section on the supply chain).

SHLs engage with other stakeholders

SHLs also needed to engage with other key retrofit stakeholders e.g., planning authorities and Distribution Network Operator (DNOs) to execute projects successfully.

Assumptions: SHLs are aware of the need to engage with these stakeholders, have the capability and capacity to do so, and/or are provided with support through the DP.

Risks: Poor engagement from DNOs (e.g. for power cable access) and difficulties with planning permission lead to project delays. Planning permission may particularly be an issue where the intention is to install external wall insulation.

Output: As in the main diagram, the installation of high-quality energy performance measures in social homes is the key output of Wave 2.1.

Risk: Poor weather conditions, or unexpected risks (bats in roof, preliminary work) can cause delays, require extra budget, or reduce the number of projects moving forward.

Outcomes for SHLs

Increase in SHLs managing high-quality energy performance retrofit projects

The increased capacity of SHLs to manage high-quality energy performance retrofit projects is a key outcome for Wave 2.1, and is driven by the availability of funding, enabling a larger volume of high-quality energy performance works to be carried out in a more efficient manner than otherwise. In addition, the above activities explain how gaps in SHL capabilities were overcome to facilitate delivery of these projects.

Dissemination of best practice in and benefits of social housing retrofit

Another important outcome is increased sharing of knowledge provided through the TAF Bridge and the DP, via the SHRA, and case study reports on best and cost-effective practices. Knowledge sharing can also reach those not currently participating in Wave 2.1.

Reduced requirement for other improvement works

An additional outcome is a potential reduction in requirements for other improvement works, for example, to deal with condensation and damp from homes that are improved through Wave 2.1. These homes are expected to have better insulation as well as ventilation, thus decreasing the prevalence of mould and degradation due to dampness. This increases the home's value and available budget for further measures or other retrofits across the SHL's housing stock.

Benefits for SHLs

The above outcomes lead to two of the key benefits provided by Wave 2.1.

An increase in SHL confidence and ability to decarbonise their stock

SHL confidence and ability to decarbonise their stock is improved through staff learning and the development of new processes and resources on their funded project. It is also likely to be enhanced by cross-learning with other projects and HUG.

An increase in SHL plans to retrofit

The learning and confidence building derived from undertaking projects is expected to increase the plans of SHLs to retrofit.

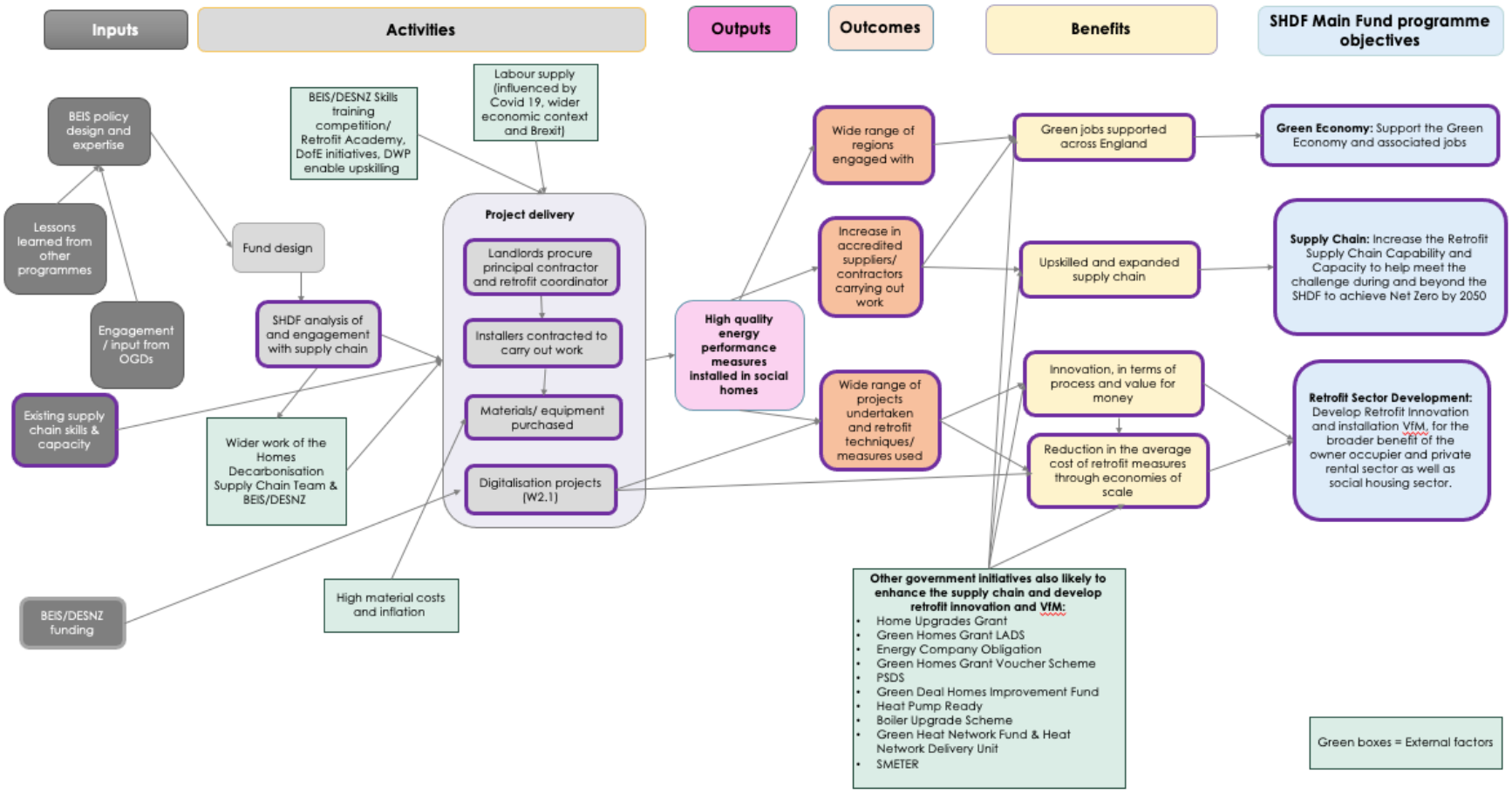
External factor: Currently or in the future, there may be an expectation amongst SHLs that the Government will introduce new regulations on the energy performance of social housing as part of the pathway to net zero. This could be, for example, minimum energy efficiency standards, an EPC C requirement, etc. This may motivate SHLs to undertake activity independently thereby potentially reducing the additionality of Wave 2.1.

External Factor: SHL capacity and capability to decarbonise their housing stock could also be built through other government or housing sector initiatives. However, SHLs are not expected to be accessing other government energy efficiency schemes in significant numbers. Other stakeholder housing sector organisations may disseminate information on decarbonisation of social housing stock. Government support for clean heat infrastructure and initiatives will also facilitate future decarbonisation of social housing stock.

2.4 The pathway to supply chain building, retrofit innovation and Value for Money

Wave 2.1 has objectives to develop the green economy and associated jobs, to develop retrofit innovation and installation value for money, and to increase the retrofit supply chain capability and capacity. This section describes inputs and activities that are part of the causal pathway related to these benefits (Figure 4).

Figure 4: Supply chain capacity and capability building, retrofit innovation and value for money



Supply chain inputs

Existing supply chain skills and capacity

In addition to the inputs already described, there is an existing body of expertise and knowledge within the retrofit supply chain to support delivery of the decarbonisation of the UK housing sector. However, there has been a significant gap in labour skills and capacity in terms of what is required to meet the burgeoning demand from this and other housing retrofit initiatives on the pathway to net zero. The large Wave 2.1 investment and subsequent substantial pipeline of retrofit measure requirements are intended to signal to the supply chain market the case for investing in upskilling and capacity building.

Activities involving the supply chain

Supply chain analysis

Two types of analysis were conducted to map and understand supply chain capabilities and constraints. The first strand involved partner analysis of the successful 107 bids in Wave 2.1. The second strand focused on the wider supply chain market and included a data led assessment of market capacity based on existing data available across all energy efficiency economic stimulus scheme in Wave 2.1. These exercises highlighted a range of pressing challenges in the supply chain including rising material and labour costs, shortage of qualified installers and retrofit coordinators and the need for policy certainty in government investment to support supply chain activity.

Supply chain engagement

Wave 2.1, like Wave 1, implemented engagement plans and strategies to ensure the supply chain market was aware of the financial opportunities available. These activities aimed to instil confidence to invest in expanding capacity in material and labour supply. This built upon work at Wave 1 to develop a taxonomy of the supply chain for retrofit, including labour, skills, materials, contractors and leadership and sponsorship (SHLs).

Under Wave 2.1, the external engagement plan continued building and maintaining relationships through trade body consultations, the Supply Chain Industry Forum, the Green Construction board and involvement in industry events/panels. Internal mechanisms like learning communities feedback knowledge from Wave 2.1 projects. An example is the engagement underway to build industry consensus on PAS 2035 accreditation which emerged as a key challenge in project delivery. Supply chain risks and challenges are also shared across home capital delivery schemes in the Net Zero Buildings – Domestic portfolio to ensure a coordinated and complementary approach.

Project delivery

Thanks to TAF Bridge support and wider DESNZ interaction with the supply chain, SHLs were able to appoint retrofit coordinators. These coordinators were then also able to secure accredited installers and source high-quality materials to install energy performance measures.

The DA supported management of contracts for these service subcontractors to ensure successful delivery.

Assumption: The different individuals and organisations within the supply chain are able to work effectively together to deliver the installations as required.

In Wave 2.1, digitalisation projects could enable scaling of existing technical solutions to standardise retrofits enabling scaling of the number and quality of projects.

External factor/risk: Price inflation causing high materials and/or labour costs may delay projects or reduce the number of installations.

External factor: TAF Bridge interaction with the wider work of the Homes Decarbonisation Supply Chain Team and DESNZ informs the Wave 2.1 supply chain engagement approaches and facilitates cross-learnings. Other DESNZ programmes like the Skills Training Competition, the Retrofit Academy and Department of Education initiatives provide upskilling opportunities for installers and retrofit coordinators.

Risk: Parallel portfolio-level energy efficiency schemes run the risk of cross-cannibalising supply chain resources leading to delays and cost overruns.

External factor/risk: The supply chain finds new build work and/or other private sector opportunities more attractive than those of Wave 2.1.

Output: The key output for Wave 2.1 is the installation of high-quality energy performance measures in social homes.

Outcomes relating to the supply chain

The installation of measures leads to a number of outcomes relating to the supply chain and retrofit sector.

Wide range of regions engaged with

Energy performance measures are installed in regions across England.

Assumption: Projects are awarded in a relatively balanced way across the regions.

Risk: Supply chain constraints in specific areas limit achievement of this outcome.

Increase in accredited suppliers/contractors carrying out work

In response to the large pipeline of Wave 2.1 projects and DESNZ engagement with the supply chain, the supply chain expands capacity and capability such that retrofit coordinators, installers and materials are available for use on projects. The requirement for Trustmark/MCS accreditation drives suppliers to invest in achieving accreditation. In some cases, SHLs undertake work in-house and reskill their existing workforce to undertake standard fabric installations (not more specialised work).

Assumption: Sufficient numbers of installers/suppliers have the resource to achieve Trustmark and MCS accreditation. The supply chain can identify an ongoing business case for providing retrofit services to justify this investment. This holds true regionally to enable projects in different areas to progress successfully.

Risk: Suppliers choose not to become involved because PAS 2035 adds significant administrative and reporting burden.

Risk: Suppliers choose not to undertake MSC accreditation and to install clean heat measures because this is too much of an additional cost on top of PAS 2035/Trustmark.

Risk: A perceived lack of long-term policy certainty reduces supply chain appetite to invest in accreditation and upskilling.

Wide range of projects undertaken and retrofit techniques/measures used

A diversity of social housing retrofit projects varying in archetype, tenure mix, and resident type were undertaken and involved installation of a wide range of retrofit techniques/measures.

Benefits relating to the supply chain and retrofit innovation and value for money

Green jobs supported across England

Installation of energy performance measures in social homes across the English regions leads to an increase in the creation, maintenance and upskilling of both direct and indirect green jobs and apprenticeships amongst retrofit coordinators, installers and manufacturers. This contributes to delivery of the levelling-up agenda. A knock-on effect may occur within the other countries of the UK.

Upskilled and expanded supply chain

The requirement for Trustmark/MCS and PAS certification has driven suppliers to invest in achieving accreditation thereby increasing the overall number of certified installers. The pipeline of work is also expected to have increased capacity and capability amongst retrofit coordinators and manufacturers of required materials. The Wave 1 coordination of different measures to be installed in multiple homes in one location, plus the scale of the works, provides a valuable opportunity to the supply chain.

Innovation in process and VfM

Whilst Wave 2.1, did not require innovation or use of new technologies (unless the project used Digitalisation funding) undertaking large-scale retrofitting inherently spurs some innovation in processes. Enabling innovation (in both process and product) can drive down retrofit costs and improve value for money. The innovation is expected not only in retrofit technologies, but also in relation to procurement and collaboration between actors. Digitalisation projects under Wave 2.1 are also expected to contribute to innovation through

improved assessment of properties, design of retrofit solutions and/or optimisation of energy usage.

External Factor: Other schemes (Green Homes Grant, energy innovation schemes: SMETER, Heat Pump Ready, etc.) may support the projects through novel technologies and processes, including digitalisation and efficient heat systems.

Reduction in average cost of retrofit measures

Wider implementation of retrofit measures can benefit from economies of scale leading to reduction in the average cost and time of retrofitting. Digitalisation projects under Wave 2.1 are also expected to further drive down costs.

External factor: High levels of inflation will affect the average cost of retrofit measures.

Wave 2.1 scheme objectives:

Upskilled and expanded supply chain

Exposure to retrofit projects leads to learning and improvement in processes and methods, consequently increasing supply chain capabilities across retrofit coordinators, installers and manufacturers. Positive experience and learning on Wave 2.1 drive participating suppliers' interest and confidence in expanding capabilities and capacities further. Awareness of positive outcomes and opportunities on Wave 2.1 by non-participating suppliers develops their interest in upskilling and expanding their capacity for future waves and similar opportunities.

Development of the retrofit sector

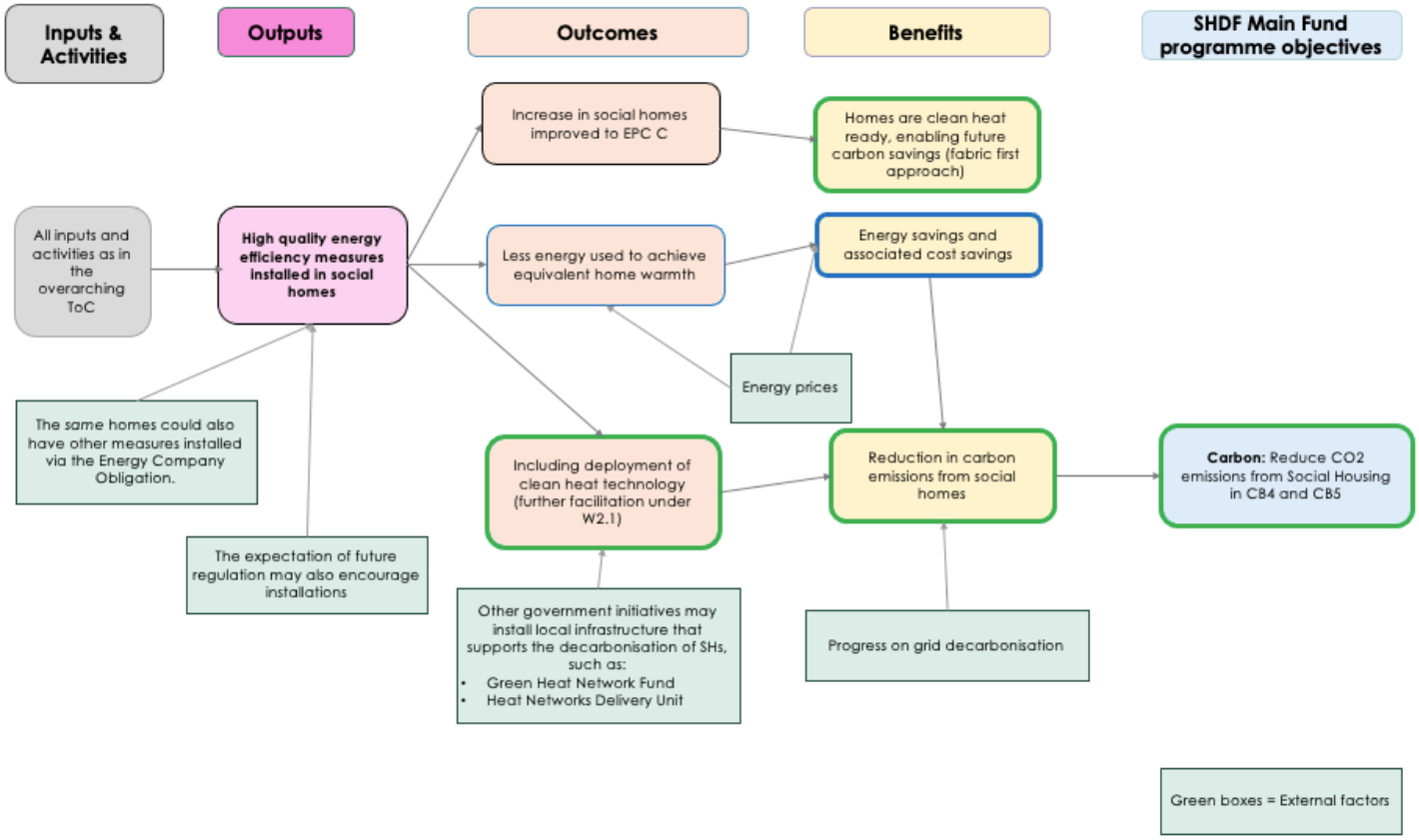
Innovation in retrofit and reduced average cost of measures support wider development of the retrofit sector for the broader benefit of the owner occupier and private rental sector as well as the social housing sector. Knowledge creation and learning from the projects enables replicability and scaling up of innovative retrofitting measures.

External factor: Other government initiatives are also likely to influence the supply chain, development of retrofit sector, and VfM. These include: Home Upgrades Grant, Green Homes Grant LADS, Energy Company Obligation, Green Homes Grant Voucher Scheme, PSDS, Green Deal Homes Improvement Fund, Heat Pump Ready, Boiler Upgrade Scheme, Green Heat Network Fund, and Heat Network Delivery Unit.

2.5 Pathway to Energy and Carbon Savings

The inputs and activities already described in the previous sections are expected to lead to the installation of high-quality energy performance measures in social homes as the principal output of Wave 2.1. This next section describes how installation of these measures is intended to lead to environmental benefits in the form of energy and carbon savings, ultimately feeding into the overarching objective of the scheme to reduce CO_2 emissions from social housing in the fourth and fifth Carbon Budgets (Figure 5).

Figure 5: Pathway to energy and carbon savings



Outputs: The principal output of Wave 2.1 is to install high-quality energy performance measures in social homes. These measures can include any energy efficiency and heating measures which are compatible with the Standard Assessment Procedure (SAP) 2012. For example, wall, loft and underfloor insulation and heat pumps.

Assumption: Any installations and retrofits are made in line with expectations and are up to standard. Eligible installers must be TrustMark accredited (or equivalent) or MCS accredited (or equivalent) where relevant. Any installations should be in compliance with PAS 2035 specifications for whole house retrofit. SHLs must adhere to all relevant building safety and construction product regulations and requirements. Upon the completion or works, properties involved are expected to reach at least EPC Band C (or Band D, where this is not possible for properties originally at EPC F or G), with a space heating demand target of 90 kwh/m2/year, where reasonable and cost effective.

External factor: It is possible that SHLs access other public funding (Home Upgrades Grant or the Green Homes Grant) to install energy performance measures directly or that some measures could also be installed by energy suppliers in social housing via the government ECO schemes. However, it is intended that the main government support scheme used in social housing will be SHDF (now WH:SHF).

External factor: SHL expectations about the potential for future government regulation of energy standards in social housing, or internal SHL desire to contribute to net zero pathways, might motivate additional investment outside Wave 1 in energy performance measures either currently or in the near future.

Environmental outcomes

Increase in social homes improved to EPC C

As a result of the installations, social homes are improved to EPC Band C or higher. Where properties were originally at EPC Band F or G and it is not possible to reach EPC Band C, properties must reach Band D upon the completion of works.

Energy savings

The installation of more efficient technologies lead to energy savings. Residents can use less energy to achieve equivalent home warmth.

Assumption: Residents use any new equipment appropriately and effectively and can access instructions or support for this where necessary.

Assumption: SHLs employ sufficient monitoring and evaluation of the measures installed to ensure that any performance issues are identified and addressed. Guidance and advice from the TAF Bridge (including the SHRA) and the DP is sufficient to support SHLs where their expertise is limited.

Risk: There is a performance gap whereby the performance of energy efficiency measures is poorer than expected, reducing the energy and carbon savings resulting from the measures.

Risk: There is a rebound effect in which residents increase their energy use because they can now afford to heat their homes to a higher temperature or use other electrical appliances for longer periods due to the cost savings arising from energy efficiency measures. However, this may be unlikely in the current context of high energy prices.

External factor: Energy prices ultimately affect cost savings arising from reduced energy use but change in energy prices may also directly affect resident behaviour in relation to energy use. High energy prices may lead residents to reduce their energy use (with or without energy performance measures).

Deployment of clean heat technology

Energy performance measures include the deployment of clean heat technology, which has been sought to a greater extent at Wave 2.1 than at Wave 1.

External factor: Other government initiatives and regulations are also expected to support the deployment of clean heat technology, for example by installing local infrastructure to support decarbonisation of social homes (e.g. the Green Heat Network Fund and the Heat Networks Delivery Unit).

Risk: SHLs may have decided not to install clean heat measures because this can lower rather than improve a property's EPC rating. SHLs may also delay decisions to install clean heat because there is uncertainty about government policy on gas boilers and on use of hydrogen versus electrification of heat.

Risk: SHLs may also face particular reluctance from residents to have clean heat measures installed.

Environmental benefits

Carbon, energy and associated cost savings

Where residents reduce their energy use, this leads to reductions in energy costs. This energy saving also leads to reductions in carbon emissions. There are also additional carbon savings arising from the deployment of clean heat technologies.

Homes are clean heat ready

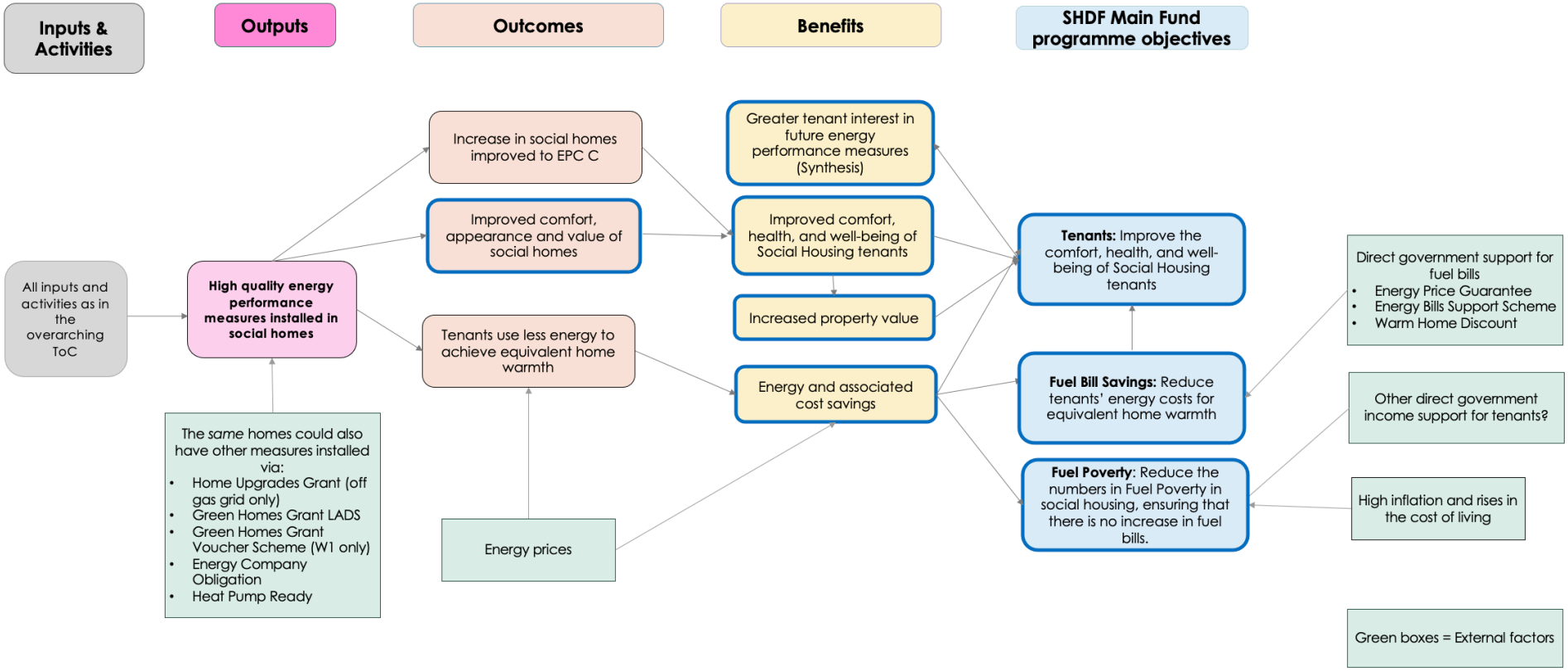
The improvement of social homes to EPC C through a fabric first approach is likely to make homes more suitable for the future installation of clean heat measures. This unlocks the potential for future additional carbon savings.

External factor: Progress on decarbonisation of the grid will also influence the carbon savings achieved.

2.6 Resident impacts

The inputs and activities already described in the previous sections are expected to lead to the installation of high-quality energy performance measures in social homes as the principal output of Wave 2.1. This next section describes how installation of these measures is intended to lead to benefits for residents as per the objectives of the scheme to: improve the comfort, health and wellbeing of social housing residents; reduce residents' energy costs for equivalent home warmth; and, reduce the numbers in fuel poverty in social housing (Figure 6).

Figure 6: Pathway to resident impacts



The inputs and activities already described in the previous sections are expected to lead to the installation of high-quality energy performance measures in social homes as the principal output of Wave 2.1. This next section describes how installation of these measures is intended to lead to benefits for residents as per the objectives of the scheme to:

- Improve the comfort, health and wellbeing of social housing residents.
- Reduce residents' energy costs for equivalent home warmth.
- Reduce the numbers in fuel poverty in social housing.

Resident outcomes

Improved comfort, appearance and value of social homes

As a result of the installation of energy performance measures, social homes will be more comfortable and have an improved appearance. Homes could be warmer and less damp with less mould. Installation of insulation leads to improved appearance of the property structure through, for example, newly rendered internal and external walls or new doors, windows, or glazing.

Resident benefits

Fuel bill savings and reduced numbers in fuel poverty

Residents using less energy to heat their homes to equivalent warmth results in associated energy and cost savings (noting the assumptions, risks and external factors articulated in the previous section). Lower fuel bills are then expected to reduce the overall number of residents experiencing fuel poverty.

Assumption: Residents of different types including by age, gender, ethnicity and disability (as protected under the Public Sector Equality Duty) are able to benefit equally from installation of measures and arising benefits.

Risk: Residents with protected characteristics are less able to benefit than other residents because, for example, health problems mean they are not able to accommodate the disruption or displacement associated with the installation of energy performance measures.

Assumption: Fuel poverty is being measured by Low Income Low Energy Efficiency Indicator (LILEE) where someone is in fuel poverty if the property EPC is below C, and after heating their home they are left with a residual income below the official poverty line (60% below median equalised income after housing costs).

External factors: Fuel bills are also expected to be significantly affected by direct government support for fuel bills including the current Energy Price Guarantee, Energy Bills Support Scheme, Warm Home Discount and any other future support. Other direct government income support for social housing residents plus other significant changes to household income (for example, arising from inflation) would also affect their likelihood of experiencing fuel poverty using the LILEE definition.

Improved comfort, health and well-being of social housing residents

The improved comfort and appearance of social homes could lead to physical and mental health benefits from reduced risk of cold-related illnesses, mould or damp related illness and greater mental well-being from pride in place. The improved pride of place could encourage social housing residents to purchase their homes.

Lower fuel bills are also expected to improve the mental well-being of residents, by reducing the stress burden.

Greater resident interest in future energy performance measures

When residents see improved comfort, health and well-being as a result of the energy performance measures installed, it could promote interest in further energy efficiency or low carbon heating measures. The same could occur when non-participating residents see the improvements being made to other properties.

Assumption: Benefits are visibly apparent to non-participating residents or are communicated and disseminated sufficiently by residents, SHLs and/or government.

3 Detailed Evaluation Questions

Table 1: Evaluation questions and which chapters address these in this report

Number	Question	Chapter
1.1	What were the drivers and barriers to successful applications to Wave 2.1?	Chapter 3
1.2	How effective and timely was the marketing of Wave 2.1, including SHRA activity, in successfully reaching and engaging SHLs?	Chapter 3
1.3	How effective was Wave 2.1 support, including SHRA, in enabling SHLs to make successful funding applications?	Chapter 3
1.4	To what extent did the number, scale and profile of successful bids for Wave 2.1 reflect the scale and profile of outcomes the scheme is intended to achieve?	Chapter 3
1.5	How effectively has project delivery and performance been managed in Wave 2.1?	Chapter 4
1.6	To what extent has the DP fulfilled the requirements outlined in the Delivery Model Assessments for Wave 2.1? Why not?	Chapter 4

1.7	What difference has the involvement of the DA made in Wave 2.1 to Wave outcomes?	Chapter 4
1.8	How effective was Wave 2.1, including the DP, in providing ongoing support to SHLs to enable successful project delivery?	Chapter 4 and Chapter 5
1.9	How effective was Wave 2.1 in analysing and engaging with supply chains to enable successful project delivery?	Chapter 5
1.10	How effective was Wave 2.1 support for post measure installation activity to support realisation of benefits, including supporting SHLs to advise and guide residents as needed to use any new equipment appropriately and effectively?	Chapter 6
1.11	How efficiently has Wave 2.1 been managed including in terms of application and scheme management and support processes and the appointed sub-contractors delivering these functions?	Chapter 3 and Chapter 4
2.1a	Have Wave 2.1 projects delivered at the intended scale?	Chapter 4
2.1b	Have Wave 2.1 projects delivered on time?	Chapter 4
2.1c	Have Wave 2.1 projects delivered cost-effectively?	Chapter 4
2.1d	Have Wave 2.1 projects delivered installations of high quality?	Cannot be answered at this stage
2.1e	Have Wave 2.1 projects delivered a positive resident experience of and satisfaction with the installation process?	Chapter 6
2.1f	Have Wave 2.1 projects delivered in line with the ‘fabric first’ approach?	Chapter 3
2.1g	Have Wave 2.1 projects delivered in line with the ‘lowest regrets’ approach?	Cannot be answered at this stage
2.1h	Have Wave 2.1 projects delivered as originally intended? Why / why not?	Chapter 4
2.2	What variation has there been in project delivery in Wave 2.1?	Chapter 4
2.3	What have been the critical success factors for and barriers to project performance in Wave 2.1?	Chapter 4
2.4	How have external factors influenced project success in Wave 2.1?	Chapter 4

2.5	What, if any, other sources of support and guidance and SHLs using other than that provided through the scheme?	Chapter 4
3.1	How effectively have learnings from the SHDF Demonstrator and Wave 1 been incorporated into the delivery of Wave 2.1?	Chapter 3
3.2	How effectively are learnings being collated and used to adjust delivery within and for future scheme waves, including to new emerging risks or opportunities?	Chapter 4
3.3	Have projects in Wave 2.1 successfully validated evidence and learning about the deliverability of retrofit at scale, and how?	Cannot be answered at this stage
3.4	To what extent do changes in design for Wave 2.1 reflect learnings from predecessor funding within SHDF and/or other Government-funded energy efficiency schemes?	Chapter 3
4.1	To what extent and how has the design of Wave 2.1 effectively supported requirements for prioritisation of measures and/or properties?	Chapter 3
4.2	To what extent and how has the design of Wave 2.1 effectively supported PAS 2035 quality requirements and the use of Trustmark?	Chapter 4 and Chapter 5
4.3	To what extent and how has the design of Wave 2.1 effectively supported requirements regarding facilitation of low carbon heating?	Chapter 3 and Chapter 4
4.4	What was the impact of the change in Wave 2.1 of allowing direct applications from Registered Providers of social and registered charities?	Chapter 3
4.5	Did the longer delivery window for Wave 2.1 improve outcomes?	Chapter 3 and Chapter 4
4.6	To what extent and how did the change to 50% minimum co-funding affect applications and project outcomes under Wave 2.1?	Chapter 3
4.7	To what extent and how has the infill tenure policy been an enabler or barrier to achieving Wave 2.1 aims?	Chapter 3
4.8	Was an appropriate proportion of funding allocated to administration and ancillary costs?	Chapter 4
4.9	What effect did the introduction of a minimum bid size in Wave 2.1 have on outcomes, including whether it acted as a barrier to small organisations applying for funding?	Chapter 3

5.1	To what extent have residents been satisfied with the energy performance measures installed?	Chapter 6
5.2	To what extent, and how, has Wave 2.1 contributed to delivering more comfortable homes for residents?	Chapter 6 and Chapter 4
5.3	To what extent, and how, has Wave 2.1 contributed to reducing the risk of fuel poverty amongst scheme beneficiaries?	Cannot be answered at this stage
5.4	To what extent, and how, has Wave 2.1 contributed to change in resident physical health?	Chapter 7
5.5	To what extent, and how, has Wave 2.1 contributed to change in resident mental health and wellbeing?	Chapter 7
5.6	To what extent, and how, has Wave 2.1 contributed to change in residents' interest in future energy efficiency or low carbon heating works?	Chapter 7
5.7	To what extent, and how, has Wave 2.1 contributed to change in residents' behaviours and attitudes in relation to energy use?	Chapter 7
5.8	How have impacts on residents varied by resident type?	Chapter 6 and Chapter 7
6.1	How many of the energy performance improvements funded by Wave 2.1 would SHLs have undertaken without DESNZ funding to the same timescale?	Chapter 3
6.2	What skills and resources have SHLs developed through participation in Wave 2.1, and how have these been developed?	Cannot be answered at this stage
6.3	How has Wave 2.1 developed SHLs' awareness and knowledge of the energy performance of their housing stock and energy performance measures	Cannot be answered at this stage
6.4	How has Wave 2.1 developed SHLs' confidence in and ability to procure and deliver energy performance installations?	Cannot be answered at this stage
6.5	How has Wave 2.1 developed SHLs' ability to produce high quality applications for future government funded retrofit schemes?	Cannot be answered at this stage

6.6	To what extent and how, has participation in Wave 2.1 contributed to increasing the size, scale or quality of SHLs' future plans for decarbonisation of their stock?	Cannot be answered at this stage
7.1	How many social homes have had upgraded EPC ratings including specifically to EPC rating C, due to installation of energy performance measures in Wave 2.1?	Chapter 4
7.2	What energy savings have been generated by the installations of energy efficiency measures in Wave 2.1?	Cannot be answered at this stage
7.3	To what extent has the installation of energy performance measures in Wave 2.1 delivered a reduction in fuel bills?	Cannot be answered at this stage
7.4	What carbon emission reductions has the installation of energy performance measures in Wave 2.1 delivered?	Cannot be answered at this stage
7.5	How have these impacts varied by building archetype and/or measure mix?	Cannot be answered at this stage
7.6	To what extent has the installations of energy performance measures prepared the fabric of social homes so that it is suitable for future clean heat installations?	Cannot be answered at this stage
7.7	To what extent are anticipated future changes, such as regulation of the energy performance of social housing, likely to reduce the necessity and/or impact of Wave 2.1 outcomes?	Cannot be answered at this stage
8.1	To what extent and how has Wave 2.1 contributed to greater value for money for DESNZ and for the retrofit sector through economies of scale, cost reductions in retrofit improvements, and lowered average cost of retrofit per home?	Cannot be answered at this stage
8.2	What variation has there been in installation costs and value for money for different types of installations and measure mixes?	Chapter 5
8.3	To what extent have SHLs used scheme funding to target hardest to treat stock, and how has this affected value for money?	Chapter 3 and Chapter 4
8.4	To what extent, and how, did Wave 2.1 lead to innovation in the products or methods used in retrofit?	Chapter 3 and Chapter 5

8.5	To what extent and how has innovation contributed to improvement in value for money?	Cannot be answered at this stage
8.6	To what extent did outputs from projects in receipt of Digitalisation Uplift funding improve the quality and quantity of building performance evidence from the scheme?	Cannot be answered at this stage
8.7	To what extent has Digitalisation Uplift funding informed DESNZ and external stakeholders' strategies and evidence bases for decision making within the retrofit sector?	Cannot be answered at this stage
8.8	To what extent has Digitalisation Uplift outputs improved retrofit processes and strategies, including streamlining PAS assessments, SHL support for residents, stock modelling and targeting for future installation of retrofit?	Cannot be answered at this stage
8.9	To what extent, and how, has Wave 2.1 contributed to improvements in building standards and safety?	Cannot be answered at this stage
8.10	To what extent, and how, has Wave 2.1 contributed to any unintended or negative impacts?	Cannot be answered at this stage
9.1	To what extent, and how, has Wave 2.1 contributed to upskilling in the supply chain?	Chapter 5
9.2	To what extent, and how, has Wave 2.1 contributed to building capacity in the supply chain?	Chapter 5
9.3	What barriers still exist to the capability and capacity of the supply chain to deliver the decarbonisation of social housing?	Cannot be answered at this stage
9.4	How well has the use of the supply chain been coordinated with other DESNZ energy efficiency schemes?	Chapter 5
9.5	To what extent has Wave 2.1 contributed toward supporting an increased supply chain over and above other government (or external) initiatives?	Cannot be answered at this stage

4 Primary fieldwork

4.1 Resident survey

Resident survey overview

A total of 1,867 residents across 63 projects, who had agreed to have energy saving measures installed in their home under Wave 2.1, took part in the 'pre-installation' resident survey. The survey was split in three tranches, to account for different installation times across Wave 2.1 properties. At the time of the survey, works had not started in just under half of residents' homes, with a similar proportion having had at least some of their installation work started or works recently completed. The survey captured key demographic and property characteristics, types of measures installed, residents' views and experience of heating their home, issues experienced in their home prior to installation, the installation process, their motivations for agreeing to having measures installed, and early outcomes of installations. Respondents could complete the survey online or via telephone.

Resident survey sample

The original target was to achieve 2,000 survey responses. Because of the limited available sample frame, a census approach was taken for Wave 2.1 participating residents. In total, 12,532 residents were invited to take part in the 'pre-installation' survey, representing 63 projects out of 104.

Resident survey fieldwork

As the start and completion dates of Wave 2.1 projects varied, the survey was disseminated in three tranches (tranche 1: September and October 2023, tranche 2: November and December 2023, tranche 3: May to August 2024).

All eligible residents were sent an invitation letter by post to take part in a 10-to-15-minute online survey via a unique link or QR code. Residents that did not respond following the invitation letter were sent reminder letters or emails (when an email address was known) and were contacted by telephone and offered the option to complete the survey over the phone with an interviewer. Respondents received a £10 e-voucher or a physical shopping voucher as a thank you for taking part.

A 'follow-up' survey will occur in 2025, once all residents are expected to have experienced at least one full winter season after the installation of measures. The findings from this 'follow-up' survey will be used to inform the impact evaluation.

In total, 1,867 residents receiving installations via 63 projects completed the 'pre-installation' survey (a 15% response rate relative to uploaded sample). 38% of surveys took place via

telephone, and 62% online.[4] This resulted in a maximum error margin of +/-2.8% at the 95% confidence level.

Resident survey questionnaire

The resident survey covered the following topics:

- Awareness of energy saving measures
- Property profile
- Installation status
- Heating status
- Issues experienced in home before the installation of energy saving measures
- Motivations to receive energy saving measures
- Installation process
- Outcomes following the installation of energy saving measures
- Views on receiving further energy saving measures in the future
- Demographic questions about household

Table 19 outlines individual survey questions and the evaluation questions addressed. Small amends were made between the three tranches to improve the quality of the data collected (following feedback collected via residents during telephone interviews).

Weighting adjustments

We applied a post-stratification weighting adjustment to help make the characteristics of the respondents taking part in the survey as close as possible to the profile of the population of residents receiving installation measures (based on our understanding from the Wave 2.1 management information (MI) data). This aims to reduce potential bias in the survey estimates towards the experiences and attitudes of those more likely to participate in the survey.

The profile of the respondents could differ from the population of residents taking part in the scheme partly due to the design of the sample (more detailed provided below) and partly as a result of non-response (i.e. when the characteristics of the respondents differ from the non-respondents in ways that are associated with the data that we are capturing in the survey).[5]

In terms of sample design, the survey was conducted in tranches using available sample from projects that had submitted resident contact details to DESNZ. The submission of these resident details did not proceed at an even pace across all the regions involved in the scheme. In particular, a large volume of sample was provided by Sovereign Housing Group, across two projects: Project 875 (a nationwide project) and Project 1064, based in the East of England. As a result, we achieved more interviews with residents in the East of England than would be necessary to be representative of the national distribution of the scheme.

[4] 259 residents responded in tranche 1, 534 in tranche 2 and 1074 in tranche 3.
[5] See Bethlehem, J. (2009) Applied Survey Methods: A Statistical Perspective. New York: Wiley for further discussion of the rationale for and approaches to weighting survey data.

When considering non-response, we would typically look at the characteristics of the survey respondents against key socio-demographic indicators for the population such as age and sex. However, the scheme MI data did not include socio-demographic information on residents who received measures against which to compare our survey respondents.

We examined the possibility of using the characteristics of all social rented sector residents living in homes with EPC D or below (taking part in the English Housing Survey, EHS) as a population frame against which to adjust the survey data. However, we concluded that we cannot say with any confidence that Wave 2.1 residents resemble the profile of all social residents. Given the known characteristics of the SHLs taking part in Wave 2.1, the nature of their stock and the types of properties selected for measures (SHLs purposively selected which of their properties would receive measures), we would not expect their residents to be representative of the whole social rented sector. There are also differences in measurement between the two surveys: the EHS reports the gender of the *householder*, who in the case of joint residents is selected on the basis of their employment status and income, whereas respondents to the resident survey for the Wave 2.1 evaluation could be either of the joint residents.

Instead, we found two scheme related indicators available from the MI data where the survey sample differed from the total population of residents in Wave 2.1, as well as project region. These were:

- The type of property (whether a flat, house or bungalow); and
- The number of properties being retrofitted in the project that the resident's property was part of.

In total, therefore, each survey respondent was assigned an adjustment according to project region, project size, and type of property. This was to make the final weighted sample more representative of all properties in Wave 2.1.

When considering property type, the weighting design mainly accounted for the slight underrepresentation of residents in terraced houses and slight overrepresentation of those in bungalows in the survey sample compared to the overall population. Similarly, residents in homes managed by the smallest projects (defined as those with less than 250 properties to treat) were over-represented in the survey population, while the prominence of larger projects in the overall housing stock was not as apparent in the survey population.

Table 2 shows the distribution of the weighting adjustment variable that was created using the Random Iterative Method (RIM) weighting approach.[6] One third (29%) of the survey sample were assigned a weight less than 0.5. These tended to be residents in the East of England whose projects had a high likelihood of being included in the survey sample, and residents in

[6] This is an iterative procedure to create a single numerical weight for each respondent from a group of variables in a statistically efficient way. For a discussion of the approach see Sharot, T. (1986) 'Weighting survey results'. *Journal of the Market Research Society*, 28 (3), pg. 269-284.

projects with less than 250 properties to treat. After making the weighting adjustment, the 'effective sample size' was reduced considerably (n=1,223).

A small proportion of the sample were assigned weights larger than 3 indicating that they were in an under-represented region, property type and scheme size. These tended to be residents in homes being treated by large projects, due to the significant proportion of the housing stock being treated by large projects compared to the final survey dataset (71% of homes corresponding to projects with more than 1,000 homes being retrofitted). Although large weighting adjustments can reduce bias in our estimates, they also reduce the precision of the estimates considerably, meaning the confidence interval around these estimates becomes very large. As is commonly practiced in survey analysis, we therefore trimmed any weights greater than 3 back to 3.

Table 2: Distribution of Wave 1 weight variable

Weight value	Number of records	Proportion of all records
0 to <0.5	538	28.8%
0.5 to <1	659	35.3%
1 to <1.5	405	21.7%
1.5 to <2	179	9.6%
2 to <3	27	1.4%
3	59	3.2%
Total	1,867	100%

Resident survey data production and analysis

A set of unweighted and weighted aggregated Excel data tables, and a clean CSV anonymised dataset with raw data, were provided to DESNZ. Relevant sub-groups were included as cross-breaks to the tables along with significance testing. Cross-breaks in the data tables include project variables, such as region, dwelling type and measures installed, as well as resident demographic variables e.g. age, gender and ethnicity and other key survey variables such as resident health conditions, satisfaction with installation process, and problems experienced in the home prior to installation.

Only findings with a base of 50 or more respondents were reported. Differences between and within sub-groups were only highlighted within the report if they were statistically significant at the 95 percent confidence level, unless otherwise stated, i.e., statistically we can be 95% confident that the differences are 'real' differences and not due to chance.

Unweighted and weighted demographic profile of resident survey

Table 3: Unweighted and weighted gender profile of resident survey

Gender	Unweighted base	%	Weighted base	%
Male	562	30%	528	28%
Female	1,167	63%	1,182	63%
Prefer not to say / missing	137	7%	157	9%
Total	1,867	100%	1,867	100%

Source: Wave 2.1 pre-installation resident survey.

Table 4: Unweighted and weighted age profile of resident survey

Age	Unweighted base	%	Weighted base	%
18-34	164	9%	172	9%
35-54	665	36%	702	38%
55-74	754	40%	715	38%
75+	185	10%	162	9%
Prefer not to say / missing	99	5%	116	6%
Total	1,867	100%	1,867	100%

Source: Wave 2.1 pre-installation resident survey.

Table 5: Unweighted and weighted ethnicity profile of resident survey

Ethnicity	Unweighted base	%	Weighted base	%
Asian/Asian British	67	4%	58	3%
Black/African/Caribbean/Black British	107	6%	115	6%
Mixed/Multiple ethnic groups	47	2%	41	2%
White	1,576	84%	1,579	85%
Other ethnic group	15	1%	14	1%
Prefer not to say / missing	55	3%	60	2%
Total	1,867	100%	1,867	100%

Source: Wave 2.1 pre-installation resident survey.

Table 6: Unweighted and weighted disability profile of resident survey

Disability	Unweighted base	%	Weighted base	%
Yes, limits activities all of the time	634	34%	616	33%
Yes, limits activities some of the time	467	25%	480	26%
Yes, but does not limit activities	139	7%	143	8%
No	515	28%	509	27%
Prefer not to say / don't know / missing	112	6%	119	6%
Total	1,867	100%	1,867	100%

Source: Wave 2.1 pre-installation resident survey.

Table 7: Unweighted and weighted working status profile of resident survey

Working status	Unweighted base	%	Weighted base	%
Full-time paid work	424	23%	441	25%
Part-time paid work	247	13%	260	15%
Long term sick leave	159	9%	161	9%
School or education	13	1%	17	1%
Unemployed / Not in paid employment / Maternity, paternity or parental leave	358	19%	360	21%
Retired	485	26%	429	15%
Prefer not to say / don't know / missing	181	10%	108	6%
Total	1,867	100%	1,867	100%

Source: Wave 2.1 pre-installation resident survey.

Resident survey limitations

Key limitations of the resident survey, and the efforts taken to mitigate these, are listed below:

- The volume of contact details for Wave 2.1 residents supplied to the evaluation team was lower than anticipated, which led to a lower achieved sample size than planned (1,867 compared to a target of 2,000). This slightly reduced the statistical robustness of the survey (our maximum error margin was +/-2.8% compared to +/-2.0% had we obtained 2,000 responses).
- Furthermore, 44 of the 104 projects were not represented in the resident survey (due to them not supplying data in time for fieldwork), while other projects were under-represented relative to the number of properties they retrofitted. This meant that our achieved sample was unlikely to be representative of the Wave 2.1 population. There may be a difference in the nature of delivery (and therefore resident experience) between projects who supplied data and those who did not, although the extent and nature of this difference is unknown. We applied weighting to the survey data to mitigate this issue.
- There can be a bias related to people who are willing and able to respond to surveys of this kind. For example, less digitally literate individuals may be less likely to complete online surveys. To mitigate this, the survey was hosted both online and over the telephone, residents were invited via postal invite, email and telephone (where

possible), and a £10 incentive was offered to all those who completed. Non-response weighting also helped reduce this bias.

- Other considerations to take into account when designing the research were the long period over which works were carried out, and the timeliness of receipt of resident property, measure and contact details from SHLs. Because of the different delivery timelines across projects, in some cases, works had begun or completed before the survey, despite the intention for the survey to be pre-installation. This means that details about the initial stages of the installation may have been harder for residents to recall. To mitigate this, the survey was administered in tranches. This enabled us to reach most residents either during or shortly after their installation completed, thereby reducing the risk of recall issues. However, some projects supplied delivery data several months after installations completed, and as a result their residents were surveyed much later than others, increasing the risk of recall bias.
- The different timings of installation dates and the survey mean that some residents' experiences and responses may have been affected by the time of year of both the installation and survey (for example, those answering in Winter might report about their thermal comfort differently compared to if they were answering in Summer). Similarly, fluctuations in the price of energy over time may have impacted their experiences of heating their homes.

4.2 Resident interviews

Resident interviews overview

Qualitative in-depth interviews were carried out with 100 individuals who had completed the participant resident survey for Wave 2.1 and agreed to take part in a follow-up interview. These interviews took place in three tranches, shortly after the equivalent tranche of the resident survey.

Interviews were conducted via Teams or telephone with each lasting approximately 45 minutes. Respondents received a £40 e-voucher or a physical shopping voucher as a thank you for taking part.

Resident interviews sample

Interviewees were drawn from the pool of individuals who completed the participating resident survey for each tranche and consented to take part in a follow-up interview. This pool were self-selecting, and therefore there was a risk of bias in the sample. These interviews are not intended to give a numerically representative picture (i.e., we do not draw inferences from numbers of respondents with a particular view) and therefore the impact of this should be limited. Table 8 to Table 12 below show the differences on key survey questions between those opting into telephone interview, and those choosing not to be interviewed, using unweighted survey data, to give some insight into potential differences in experiences and views.

Overall, those taking part in interviews were somewhat more likely to be interested in saving energy, and less likely to be satisfied with communication from their landlord, but otherwise not substantially different. It may therefore be that responses related to saving energy for environmental reasons are slightly over-represented in the qualitative interviews.

Table 8: Awareness of measures, by opt-in to follow-up qualitative interview

	Profile of those opting into qualitative interview (%)	Profile of those not opting into qualitative interview (%)
Base (unweighted)	1,147	720
Yes	74%	74%
No	21%	18%
Don't know	5%	7%
Prefer not to say	0%	1%
Total	100%	100%

Source: Wave 2.1 pre-installation resident survey. A1. Prior to this survey, were you aware that energy savings measures will be (or have recently been) installed at your home by your landlord?

Table 9: Measures installed, by opt-in to follow-up qualitative interview

	Profile of those opting into qualitative interview (%)	Profile of those not opting into qualitative interview (%)
Base (unweighted)	1,147	720
Insulation	58%	56%
Ventilation	52%	54%
Windows and doors	49%	44%
Solar panels	24%	22%
Lighting	17%	16%
Heat Pump	14%	12%
Don't know / unaware / prefer not to say	18%	20%

Source: Wave 2.1 pre-installation resident survey. Derived variable, based on C1. Which of the following energy saving measures will be (or have recently been) installed in your home by your landlord? Selected measures only.

Table 10: Whether measures installed, by opt-in to follow-up qualitative interview

	Profile of those opting into qualitative interview (%)	Profile of those not opting into qualitative interview (%)
Base (unweighted)	1,147	720
Yes	23%	27%
No - ongoing	21%	20%
No – not started	49%	44%
Don't know	7%	9%
Prefer not to say	0%	0%
Total	100%	100%

Source: Wave 2.1 pre-installation resident survey. C2. Have these energy saving measures in your home been completed?

Table 11: Whether believed measures were compulsory, by opt-in to follow-up qualitative interview

	Profile of those opting into qualitative interview (%)	Profile of those not opting into qualitative interview (%)
Base (unweighted)	1,147	720
I had no choice	36%	32%
I did not know I could not opt out	27%	24%

Source: Wave 2.1 pre-installation resident survey. F1. Why did you agree to have the energy savings measures installed in your home? Selected options only.

Table 12: Agreement with "I am interested in improving the energy efficiency of my home", by opt-in to follow-up qualitative interview

	Profile of those opting into qualitative interview (%)	Profile of those not opting into qualitative interview (%)
Base (unweighted)	1,147	720
Strongly agree	55%	42%
Agree	32%	36%
Neither agree nor disagree	7%	14%
Disagree	2%	2%
Strongly disagree	1%	1%
Don't know	3%	4%
Prefer not to say	1%	1%
Total	100%	100%

Source: Wave 2.1 pre-installation 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"?

When selecting individuals for interviews, the following aspects were taken into account:

- Case study projects[7] were prioritised where possible to enable a sufficient level of resident insights to be gathered within each of these.
    - At tranche 1, the survey did not include any sample from the case study projects. There was available sample from the reserve case study at the time, Birmingham City Council, and 11 interviews were completed from this project.
    - At tranche 2, there was still limited case study sample available. We agreed to interview a maximum of 20 residents from any one case study across tranches. We completed three interviews with one case study (Sanctuary Housing Association) and five interviews with Birmingham City Council (a reserve case study at the time).
    - At tranche 3, there was still limited case study sample available, so we agreed to also prioritise recruitment of residents in relation to thematic case studies i.e. projects receiving digitalisation funding and properties that will have Clean Heat measures installed. Tranche 3 included interviews from the following case studies: Colchester Borough Council (two), Longhurst Group (one), London Borough of Brent (two), and Birmingham City Council (three). We also

[7] More information on the case study approach is contained within Chapter 1.

interviewed 17 residents who had some form of clean heat measure planned to be installed (including Air Source Heat Pumps (ASHP), Ground Source Heat Pumps (GSHP), and another/unknown type of heat pump and communal heat network).

- Recruiters also aimed to get a spread of interviews by: type of measure(s) installed; heating type; property type/size/age; resident characteristics including age, gender, ethnicity and disability status.
- Recruiters also aimed to speak to both residents who were satisfied and dissatisfied with the communication and information they had received about the measures.

IFF's recruitment executive team contacted individuals initially by phone to encourage participation and secure a date and time for interview.

Resident interviews fieldwork

Fieldwork for the 100 interviews took place across three tranches (tranche 1: September to October 2023, tranche 2: December 2023 to January 2024 and tranche 3: between July and August 2024). Most interviews (50) took place in tranche 3.[8]

Resident interviews topic guide

The aim of resident interviews was to provide further context and detail to the responses from the resident survey. The topic guide covered the following broad topics:

- Information about household
- Initial approach and communication about Wave 2.1
- Motivations to receive energy saving measures
- Satisfaction with communication throughout the installation
- Installation process (among those who have had measures installed)
- Awareness of decarbonisation and SHDF
- Attitudes towards energy saving measures

Table 20 in Chapter 7 outlines individual interview questions and the evaluation questions the guide addressed.

Resident interviews analysis

With consent, resident interviews were recorded, and detailed interview notes produced. For analysis, interview notes were entered into an analysis framework, organised by topic. They were then coded in more detail to bring out emergent themes. Inductive coding was used within topics to respond to the specific points raised in interviews. This was then used to produce summary thematic analysis against the key evaluation questions, including verbatim quotes to provide more illustrative detail to themes.

[8] 26 interviews took place in tranche 1 and 24 in tranche 2.

Resident interviews limitations

Some limitations of the resident interviews, and the efforts taken to mitigate these, are listed below:

- Residents interviewed self-selected to respond to the resident survey and take part in a follow-up interview, and were therefore more likely to be and to represent 'engaged' residents who are willing to take part in voluntary research. We initially aimed to address this bias for the survey sample by offering an incentive, inviting respondents via letter, and conducting telephone chasing. We also offered an incentive for participation in the follow-up interviews.
- Issues relating to sample data provision, and the timing of the data collection as outlined in the 'Resident survey limitations' section also applied to the resident interviews.
- Of particular note is that – as shown above – the evaluation struggled to obtain interviews with residents from most case study projects. This affected the representativeness of findings from resident interviews within each case study, limiting the range of experiences and outcomes covered by the case studies.

4.3 Qualitative interviews with supply chain stakeholders

Supply chain stakeholder interviews overview

Qualitative in-depth interviews were carried out with 24 supply chain stakeholders who were involved in the installation of energy efficiency measures for Wave 2.1. Interviews were conducted via Teams, each lasting between 35 and 80 minutes. All respondents were offered £50 (via PayPal, Wise or as a charity donation) as a thank you for their time.

Supply chain stakeholder interviews sampling

Interviewees were selected based on project-based case studies (information about case studies is included in section 1.3 (Case study approach). However, owing to low sample availability, scope was widened to include supply chain stakeholders from thematic case studies as well as not from case studies. Of the 24 interviewed supply chain stakeholders, four worked on projects that were selected as case studies (Haig: three, Sanctuary: one), one other installed clean heat measures (in relation to the thematic case study on clean heat) and the remaining nineteen were not case study specific.

Selected case study projects covered a mix of: measures installed; building archetypes; regions; companies employed as principal contractors and retrofit coordinators; and whether the retrofit coordinator was employed in-house or not. This ensured a varied range of supply chain stakeholders, with a range of experiences, were interviewed.

A mixture of the following sources or methods were used to generate contacts for participation:

- Contacts provided by Wave 2.1 projects as part of their monthly MI data submissions, filtered by those that belonged to selected case studies.
- Using snowballing techniques with these initial contacts to determine the identities and contacts of other stakeholders and organisations involved in the installation process.
- Asking SHLs that took part in interviews to provide contact details of supply chain stakeholders who worked on their projects.
- When contact details were inaccurate or missing in the MI data, desk research was undertaken by searching company names that participated in the scheme.
- Using the EPC certificate checker website (to obtain assessor details) and the Trustmark register[9] of accredited businesses who took part in the research.

Overall, 226 supply chain stakeholder contacts were collated (44 from project-based case studies, 27 from projects feeding into the clean-heat case study, three from projects feeding into the digitisation case study, and 152 from non-case study projects). In total, 24 interviews were conducted resulting in a 10.6% response rate overall.

Supply chain stakeholder interviews topic guide

Supply chain stakeholders were categorised into four main groups to assist with topic guide design and data analysis, as shown in Table 13.

[9] The Trustmark Register is a database of businesses that have been vetted and approved to meet certain standards of quality, customer service, and trading practices. It is a UK government-endorsed scheme specifically for work carried out in and around the home. More information can be found at: https://www.trustmark.org.uk/homeowner

Table 13: Supply chain stakeholder job roles and descriptions

Supply chain stakeholder role	Description
Person/team installing measures	Usually, a sub-contractor to the lead contractor, potentially freelance or small company, potentially directly employed by lead contractor organisation or even in-house. Often several for each project.
Manager of installation teams	Person managing the team installing measures within a project. Most likely a site manager at a lead contractor, potentially could be employed in-house, or could be acting as a sub-contractor to an organisation managing multiple sites. May manage on one or multiple sites within the project.
Senior managers at principal contractors	Managing the resourcing and planning of installations. Can be an installation company director, HR manager / chief at a lead contractor, can be a consultant, can be employed in-house.
Retrofit coordinators	Bringing together / sourcing teams installing different measures. May sit at a consultant level or in-house.

The topic guide drew on the ToC, contribution claims and evaluation questions. Four overall objectives for the evaluation's research on supply chain stakeholders were created:

1. How do supply chain stakeholders view installations as part of Wave 2.1 in terms of: attractiveness of the work compared to other potential jobs; need for the work in the properties; quality of installations; efficiency of staffing, materials, and resources used; adequate timescale to carry out works; and value for money? Could any of these be improved?
2. To what extent did external factors affect the delivery of the installations?
3. How do supply chain stakeholders feel the certification requirements (PAS 2035, Trustmark, and MCS certification) of participating in Wave 2.1 activities impacted the installation process in terms of cost, resourcing, quality, and timeliness?
4. How has Wave 2.1, and the anticipation of future waves, impacted supply chain stakeholders' decision-making in terms of business growth, energy focused business diversification, upskilling the workforce, and obtaining accreditations?

Owing to the diverse roles involved throughout the installation process, each supply chain stakeholder had a different understanding of the information required to answer the relevant evaluation questions. The relevance of specific roles in addressing relevant evaluation

questions was mapped in advance of interviewing, based on desk research and experience on previous research with this audience, as shown in Table 14.

Table 14: Supply chain stakeholder objectives mapped to job roles

Objectives	Person/team installing team(s)	Manager of installation/assessor team(s)	Senior managers at principal contractors	Retrofit coordinators
1	Fully relevant	Fully relevant	Partly relevant	Partly relevant
2	Partly relevant	Fully relevant	Fully relevant	Partly relevant
3	Partly relevant	Fully relevant	Fully relevant	Partly relevant
4	Partly relevant	Fully relevant	Fully relevant	Partly relevant

The topic guide was constructed building on the objectives outlined above, on the roles of supply chain stakeholders involved in installations, and on evaluation questions. Table 15 below shows the range of interview questions mapped against the relevant audience and objectives. For tranche 1, specific questions were only asked to the relevant audience. For tranche 2, some questions intended for installers were also asked to retrofit co-ordinators and senior managers, to ensure sufficient insight was captured (despite the small number of installers taking part in interviews).

The topic guide covered the following broad topics:

- Background on role and responsibilities within their own business
- Understanding of the scheme 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

Table 22 in Chapter 7 outlines individual interview questions and the evaluation questions the guide addressed.

Supply chain stakeholder interviews fieldwork

Fieldwork for the 24 interviews took place across between February and May 2024. Table 15 and Table 16 show the distribution of the 24 interviews by case study project and job role.

Table 15: Supply chain stakeholder interviews by case study project

Case Study Type	Number of completed interviews
Haig Housing Trust	3
Sanctuary Housing Association	1
Clean-heat case study	1
Non-Case Study	19
Total	24

Table 16: Supply chain stakeholder interviews by interviewee role

Job role	Number of completed interviews
Person / team installing measures	1
Manager of installation teams	8
Senior managers at principal contractors	11
Retrofit coordinators	3
Total	24

Supply chain stakeholder interviews analysis

With consent, supply chain stakeholder interviews were recorded, and detailed interview notes produced. For analysis, interview notes were entered into an analysis framework, organised by topic. They were then coded in more detail to bring out emergent themes. An initial coding structure was developed, and inductive coding was used within topics to respond to the specific points raised in interviews. This was then used to produce summary thematic analysis against the key evaluation questions, including verbatim quotes to provide more illustrative detail to themes.

Supply chain stakeholder interviews limitations

Some limitations of supply chain stakeholder interviews, and the efforts taken to mitigate these, are listed below:

- Supply chain stakeholders interviewed self-selected to take part in an interview, thus representing those more likely to take part in research. This limitation was partially reduced by offering a £50 incentive (payment or charity) for participation in the interviews.
- Much of the sample was gathered from the MI data supplied by SHLs, and from snowballing. Projects that had more resource may have been more likely to submit full and up to date MI data and therefore may be overrepresented in the sample. Similarly, SHLs that had a good relationship with their lead contractor may have been more likely to share their contact details. Other sampling approaches used (Trustmark data and EPC certificates) were less successful in generating contacts for interviews, and were therefore less helpful to mitigate this issue.
- The ability to generalise the findings from interviews with 24 supply chain stakeholders across 19 projects is limited, given the small sample available and low participation in interviews. On the other hand, though not representative of the Wave 2.1 supply chain stakeholder audience as a whole, non-case study interviews provided greater variety of projects to analyse. The greater coverage of senior contractors and retrofit coordinators also had more knowledge of challenges across all projects as a whole.

4.4 Qualitative data collection with other stakeholders

Overview of qualitative data collection with scheme delivery stakeholders

Four semi-structured interviews of approximately 45 minutes were undertaken with four senior DESNZ staff members with roles covering senior oversight, delivery and policy. Selection of individuals was discussed with the DESNZ evaluation team. A single topic guide was developed for interviews with DESNZ staff. However, interviews were conducted flexibly such that individuals only answered questions relevant to their role and experience on Wave 2.1. These interview guides covered scheme design, pre-competition engagement, the application and appraisal process, and very early reflections on project delivery and scheme management. These interviews were undertaken in June and July 2023.

One semi-structured interview of approximately 45 minutes was held with a senior representative from the DA in July 2023. This covered the role and design of the DA, contracting and mobilisation of the DA and the DP, and very early reflections on scheme delivery and management.

Three focus group discussions were held with representatives of the DESNZ IDT team, the TAF Bridge, and the DP. Tailored topic guides were developed for each group covering topics relevant to the respondents including: Wave 2.1 pre-competition support, application and appraisal processes and very early reflections on scheme delivery and management. The TAF Bridge focus group and the DP focus group were held in September 2023 and lasted

approximately 45 minutes each. The DESNZ IDT focus group was held in July 2023 and lasted approximately 90 minutes.

Table 23 provides greater detail on the topics covered in DESNZ senior management and DA interviews and in the TAF, DP and DESNZ delivery team focus groups, and lists the evaluation questions the guides addressed.

Interviews and focus groups were all recorded, and recordings and transcripts were used to write up detailed notes. For analysis, interview and focus group notes were first organised by topic and were then coded in more detail using NVivo. An initial coding structure was developed, but inductive coding was used within topics to respond to the specific points raised in interviews and discussion groups.

4.5 Qualitative data collection with SHLs

For Wave 2.1, 15 semi-structured interviews were undertaken individually with representatives of the lead organisation and consortium partners for eight projects.

Interviews were held in two tranches, with the first tranche of interviews held in July and August 2023, at the beginning of Wave 2.1 project delivery. The second tranche was carried out in May – July 2024, part way through Wave 2.1 project delivery. The second tranche of interviews were held over a longer period of time, to account for the six-week pause in data collection as a result of the pre-election period. A third tranche of interviews will be held close to the completion of Wave 2.1 project delivery, to allow SHLs to reflect on their overall project experience and inform the case studies and the Wave 2.1 impact evaluation.

The interviews included the six projects selected as case studies, as well as the two projects which were provisionally selected as case studies. Therefore, the West of England Combined Authority and Birmingham were only interviewed in Tranche 1, and Flagship Homes was only interviewed in Tranche 2. Flagship Homes will be contacted for further interview during the third tranche of interviews.

The interview guides covered pre-existing retrofit plans and activity of projects, the Wave 2.1 application process, project delivery (enablers, barriers, support sources), and project monitoring. The interviews with representatives of the lead organisation were scheduled for 90 minutes.

In the case of one project, the interview was split into two, in order to speak with both the project lead organisation and a partner organisation. This project represented a large consortium, so consulting two separate housing providers within the consortium was deemed necessary to better understand the project and its delivery. These interviews were scheduled for 45 minutes.

Unsuccessful SHL interviews

Seven interviews were also undertaken with unsuccessful SHL applicants to Wave 2.1. DESNZ provided a sample of 24 unsuccessful applicants who had given consent for their contact details to be shared with the evaluation team. All 24 contacts were approached for interview. Of these, 17 contacts were unresponsive. Interviews were held between 6th July 2023 and 7th August 2023. The interview guide focused upon retrofit activity undertaken outside of Wave 2.1 and views and experiences of applying to Wave 2.1.

Interviews were all recorded, and recordings and transcripts were used to write up detailed notes. For analysis, interview and focus group notes were first organised by topic and were then coded in more detail using NVivo. An initial coding structure was developed but inductive coding was used within topics to respond to the specific points raised in interviews and discussion groups.

Detail of topics covered in SHL interviews

The following themes were covered in the SHL interviews. Table 24 in Chapter 7 outlines individual interview questions and the evaluation questions the guide addressed. In summary, the following broad topics were covered:

- Pre-existing retrofit plans before Wave 2.1 application
- Engagement with SHRA
- Application process and decision making
- Retrofit activity since engagement with SHRA/the Wave 2.1 application
- Project delivery including: engaging with the supply chain; resident engagement; interaction with stakeholders and digitalisation funding (where relevant)

5 Secondary data and MI analysis

5.1 Secondary data and MI data

MI data sources

Extracts from MI data compiled by DESNZ and the DP were shared with IFF Research on a monthly basis. These were provided approximately three weeks in arrears, due to the need for collation and processing time and checks to be performed on data returns.

MI data used for this report was as shown in Table 17.

Table 17: 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)	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. Property-level data including type and age of property, pre- and post-installation Energy Performance Certificate (EPC) rating, and property location.
Monitoring data	Data submitted 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.
Project summary data	Data submitted by projects and scheme delivery teams 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.
Risk data	Data submitted by projects and scheme delivery teams 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.

English Housing Survey (EHS)	An annual MHCLG survey examining condition and quantities of housing in England.[10]	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.[11]	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.[11]	Used for providing lists of landlords and their stock, for assessing the scheme's coverage of organisations in the social housing sector.

MI data processing

Bid data and Change Control data were processed in Microsoft Excel as follows:

- Information on successful and unsuccessful bids were checked against delivery MI data and updated, for example where a project had dropped out of the scheme.
- Names of organisations from the bid analysis (triangulated against baseline application data, to include any rebranding and/or changes to consortia) were matched against official records (Housing Regulator Statistical Data Return and LA Data Return, as well as the membership list for the National Federation of ALMOs) to add organisation types and locations, and this information brought forward to other spreadsheets for sub-group analysis.
- Bid data was cross-checked by comparing total numbers of properties from each breakdown with totals for that project within the spreadsheet and in other sources.
- The locations of lead organisations for each project were checked against ONS region geography to append region variables, allowing region-by-region analysis of projects. Region data provided in the raw data was not consistent between spreadsheets and was therefore not used.
- A flag was added to identify projects submitting valid delivery MI data, to enable analysis of only these projects.

[10] MHCLG (2023) English Housing Survey. English Housing Survey - GOV.UK (www.gov.uk)
[11] 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 Change Control register was deduplicated to produce a consistent time series, and data submitted checked for each project to ensure a full record was presented over time.

Property and measure data was processed in Microsoft Excel as follows:

- Corrupt and test data was removed, as identified by (A) anomalous contents of fields (e.g., text where numbers were expected) or (B) lack of a valid project ID.
- Duplicate properties were removed using the address and combined project and property ID, prioritising the most recent available data regarding a property.
- Each spreadsheet was deduplicated to produce a consistent time series, and data submitted checked for each project to ensure a full record was presented over time. Where duplicates appeared likely, project-by-project strategies were produced (for example, filtering out monthly returns that were corrupt or did not use the same property IDs as other monthly returns, generating duplicate properties).
- Data for each project was checked against the latest Change Control data, and where the number of properties retrofitted exceeded the Change Control total, this was investigated and solutions applied on a project-by-project basis (e.g. excluding specific data returns which contained duplicate properties but with different property IDs).
- Individual fields were cleaned manually to maximise the base available for analysis, for example correcting installation dates with the incorrect year given (by comparison between the start and end of installation timestamps and adjacent rows for the same project).
- Measure types were coded via the compilation of a customised look-up; an option of an open text field to describe measures was supplied to projects which was widely used. Measures which were deemed not to be energy saving activities (e.g., ‘asbestos removal’) were removed from the file and ignored.
- Outliers were removed from costs data; all individual measure costs reported as less than £10 or over £100,000 per property were removed.

Project summary data was processed in Microsoft Excel as follows:

- Corrupt and test data was removed, as identified by (A) anomalous contents of fields (e.g., text where numbers were expected) or (B) lack of a valid project ID.
- Each spreadsheet was deduplicated to produce a consistent time series, and data submitted checked for each project to ensure a full record was presented over time.
- Individual fields were cleaned manually to maximise the base available for analysis, for example, correcting milestone dates with the incorrect year given.

Monitoring data was processed in Microsoft Excel as follows:

- Corrupt and test data was removed, as identified by (A) anomalous contents of fields (e.g., text where numbers were expected) or (B) lack of a valid project ID.
- Data was deduplicated to produce a consistent time series, and the latest data for July 2024 (used for analysis) was identified.

- Data was integrity checked to ensure it added correctly and matched the latest entry on the Change Control register (latest project plan) in terms of spending and numbers of properties involved. Where inconsistencies were found regarding a field in July 2024, this was excluded from the analysis calculations. Many projects had not updated their long-term projections to match Change Control registers.
- Data was integrity checked to ensure that KPI achievements occurred in a sensible order and within broad Wave 2.1 timelines.

Project summary data was processed in Microsoft Excel as follows:

- Corrupt and test data was removed, as identified by (A) anomalous contents of fields (e.g., text where numbers were expected) or (B) lack of a valid project ID.
- Data was deduplicated to produce a consistent time series, and the latest data for July 2024 (used for analysis) was identified.
- Data was integrity checked to ensure that milestones occurred in a sensible order and within broad Wave 2.1 timelines.

Risk data was processed in Microsoft Excel as follows:

- Corrupt and test data was removed, as identified by (A) anomalous contents of fields (e.g., text where numbers were expected) or (B) lack of a valid project ID.
- Risk data was filtered for most analyses to include only those risks which were scored (via the scoring system devised for Wave 2.1) as 15 or higher, in order to exclude hypothetical risks being registered by the projects carrying out more pro-active risk management.
- Data was deduplicated to produce a consistent time series, and identify the latest risk data, and data submitted checked for each project to ensure recent risks had been logged.

All data sources were analysed within Microsoft Excel using pivot tables.

Quantitative analysis of MI data

Statistics were analysed descriptively, using Microsoft Excel pivot tables relevant to the research questions. In general, statistical testing was not used for MI data because it was not required; statistical error margins are only applicable where partial data (such as a survey) is being used to draw inferences regarding a wider population.

The report includes a narrative on the data to assist the reader in drawing conclusions. Any limitations of the data are also highlighted to ensure correct interpretation of findings.

Qualitative analysis of MI data

Qualitative analysis of MI data was conducted in the following ways:

- Where text responses were short (e.g. freeform descriptions of measures) but high in volume, they were referred to our dedicated coding team[12] to produce coded responses for numeric analysis.
- Where text responses were longer and more varied in their content, NVivo was used to draw out themes, primarily for analysis of monitoring officer narrative data (data source 1.4). Data was analysed under two broad headings; (a) risks and mitigations put in place, and (b) barriers and enablers to delivery.
- For case studies, individual bids and project risk registers were analysed in detail, to better understand the development of risks through the project timeline.

Although the same techniques were used to analyse Wave 1 and Wave 2.1 data in NVivo, the results are not comparable since the source information being analysed (because it was compiled by different DP sub-contractors at each wave) varies substantially in design.

Qualitative data is presented in the form of narrative reporting, discussing issues emerging from the analysis thematically, supported by anonymised quotes from the sources as appropriate.

5.2 MI data coverage

The bid data returned was reasonably comprehensive, with few omissions, and provided a detailed overview of projects' plans for their Wave 2.1 funding. The key caveat regarding this data is that many SHLs in interviews stated that their knowledge of existing stock was weak and that this had been a barrier to application. This had also sometimes caused significant changes to their plans for installing measures once initial inspections of individual properties had taken place. This does suggest that bid data should be treated with some caution, although it remains likely that the overall stock profile is broadly correct.

Delivery data was compiled separately at a property and measure level, and its use for most purposes required both to be combined, by matching on property ID and/or address. Many projects had not supplied data by July 2024, or had supplied data which did not match between the two sheets. Typically, projects submit data either just before or during installations.

Where data is compared between multiple sources, in all cases, projects which had submitted data for one source but not the other were excluded from both sides of the comparison. This was to ensure like-for-like comparisons.

[12] The coding team receive the data in a spreadsheet, and load it into their dedicated coding software, Ascribe. They then use this to produce an interim codeframe based on a sample of the data, which is sent to the research team for QA and approval at Research Manager level. The coding is then completed, and given a second QA by the research team, checking the coding of at least 10% of the file. This QA is used to suggest final changes to the codeframe and to the coding of individual responses, before sign-off at Research Manager level. Quantitative data is produced from the final codeframe by IFF's programming team in simple tables (using Merlin software) for analysis by the research team alongside other secondary data sources.

Table 18 summarises the secondary data status for the 107 projects, as of end July 2024. Bid data is not shown, since all 107 successful projects provided valid bid data. Three projects had dropped out at the time of analysis, but their past activity and spending was often still included in the data analysis. Property and measure data was checked against Change Control registers (latest project plans) to determine if the number of properties included reflected the total claimed size of the project.

Table 18: Project data coverage, of 107 projects successfully bidding for Wave 2.1 funding

	Surplus** (>110% coverage*)	Complete (90-110% coverage*)	Partial (50-90% coverage*, or errors found)	Limited (1-50% coverage*)	No data, or excluded due to errors
Bid data	n/a	107	0	0	0
Delivery: Properties	6	27	29	31	14
Delivery: Measures	1	9	16	44	37
Delivery: Measure costs***	0	0	4	27	76
Actuals / Forecasts	n/a	103	2	n/a	2
Risks	n/a	97	8	n/a	2
Project Summary	n/a	101	6	n/a	2

*coverage is defined as the number of properties in the delivery data for that project relative to the latest entry in the Change Control register for the project (latest project plan). **some projects submitted details of more projects than were featured in their latest Change Control register entry. These properties, where they could not be removed (e.g., by removing an invalid return, removing properties for which no measures were proposed, or correcting ID number formats to allow deduplication) were included in the analysis. Some of these are likely to reflect a lag between updating the Change Control register and the delivery data. ***Note that these are actual costs and typically will not be compiled until installations are completed.

5.3 MI data limitations

There are some limitations to the secondary data sources presented above that affected the extent of analysis possible:

- Bid data, baseline application data, and Change Control register (project plan) data, while all comprehensive in coverage, are aggregated to a project level (i.e., they consist of total numbers of properties and overall costs of activities for a project) and therefore cannot be broken down at a property level.[13]

[13] For example, bid data shows counts of the numbers of measures of each type intended to be installed, and counts of types of properties intended to be included in the project, but because it is not property level data (only

- For a significant number of projects, delivery data was not available. Therefore, findings regarding pace of delivery reflect progress for those projects only; in other words, the implicit assumption is made that those not reporting installations are not carrying out installations. It is likely, therefore, that there is some underestimate of delivery, although it is not possible to determine the exact extent of this with the information available.
- Delivery data could still contain errors in the identification of properties or their classification. These are not detectable since we do not have another data source to compare against. It is suggested from interviews with SHLs that stock data held is often incorrect and corrected information only becomes available during installation.
- In delivery data, it is likely that projects did not always accurately report all measures installed for each property. It is difficult to estimate the extent of this issue at this stage, since measures not included in a specific project's delivery data (but included in project plans shown in Change Control registers) may be added at a later date.
- Narrative reporting, risks, and risk levels detailed in data represents the point of view of project leads and SPoCs, not the viewpoint of IFF Research regarding risks, barriers and enablers to delivery.
- Dates for KPI achievement appeared to be rarely updated, especially (but not exclusively) projected dates in the future. Many projects had submitted planned KPI achievement dates in the past (which contradicted their own written summaries of project progress stating those KPIs had not been achieved) or submitted planned KPI achievement dates in the future (which contradicted either their own written summaries, or contradicted delivery data showing these had been achieved).
- Projects' spending and future installation projections were not used for analysis in this report. This is because they were often not updated to match Change Control data, and beyond the current month often reflected superseded spending and/or installation plans.

7 Appendix: Primary data collection

7.1 Resident survey

Table 19: Core questions asked in the Wave 2.1 resident survey, and relevant themes, evaluation questions and contribution claims addressed

Section	Survey question	Evaluation Question
Awareness of energy saving measures	Are you aware of the energy savings measures that have been installed/are due to be installed in your home?	7.6

headline counts of each separately), we cannot connect types of property to types of measures planned to be installed using this source.

Section	Survey question	Evaluation Question
	Are you aware that the energy savings measures that have been installed/are due to be installed in your home are funded by the SHDF?	7.6
Property profile	When did you move into your home and what type of home do you live in (including number of floors, number of bedrooms, year the home was built…)?	Context to support analysis
	Do you own or rent the home, and who is your SHL?	Context to support analysis
Installation status	Which energy saving measures, and specifically which type, were installed or are due to be installed in your home?	Context to support analysis
	Which energy saving measures were already installed in your home before installations under SHDF?	Context to support analysis
Heating status	Before receiving the energy saving measures, which of these was the main way you heated your home? Which of these other type(s) of heaters did you use in your home?	7.6
	Which of these is the main way that you currently heat your home? And which of these other type(s) of heater do you use in your home?	7.6
	Thinking about these other types of heaters, overall, do you use them more or less often since the energy saving measures were installed? Which of the following reasons is why your energy use has increased/decreased/stayed the same?	7.6, Contribution claims 8a, 8c and 8d
Issues experienced in home	Before you received the energy saving measures, did you have any of these problems with your home? Do you currently have any of these problems with your home? (e.g. mould/mildew, condensation/steamed up windows and draughts).	5.2, 5.4
	For each problem you identified, has this got better, worse, or has there been no change since the energy saving works?	5.2, 5.4
	For each problem, did you take any other actions to solve this (apart from receiving the energy saving measures)?	5.2, 5.4

Section	Survey question	Evaluation Question
	Since the energy saving measures have been installed, have you experienced any new problems in your home?	Context to support analysis
Motivations	What were your reasons for having the energy measures installed?	2.1, 2.3
	How much do you agree or disagree with the following: “I was able to arrange the installation at a date and time convenient to me.” Why do you say that?	2.1
Installation process	Thinking about the installation process, to what extent were you satisfied or dissatisfied with: communication from the LA / your SHL, noise levels, general disruption to you / the household?	2.1, 2.3
	Thinking about the information you have received so far about the energy saving measures, how satisfied or dissatisfied were you with communication from the LA / your SHL / installer?	2.1, 2.3
	Thinking about the time it took to complete the installation of energy saving measures, how did this compare with your expectations? Overall, how satisfied, or dissatisfied are you with the installation process?	2.1
Outcomes of measures	Overall, how satisfied are you with the energy performance measures installed?	5.1
	Have you seen any changes to your household energy bills since the work has been completed? Why do you say that?	5.3, 7.3,
	To what extent do you agree or disagree with the following statements? It's easier to maintain a comfortable temperature in my home; it’s more affordable to heat my home; my mental health has improved since the work; I have more pride in my home. To what extent are you less worried about being able to afford to heat your home?	5.2, 5.4, 5.5, Contribution claim 12a
Views on further energy saving installations	As a result of having energy saving measures installed, would you say you are more or less likely to consider other energy saving installations in the future?	5.6, Contribution claim 10a

Section	Survey question	Evaluation Question
Demographic questions about household	How many people live in your house? What is the age, gender, employment status of those living in the household, and do you or anyone else in your household have any physical or mental health conditions or illnesses lasting or expected to last for 12 months or more that limits your or their day-to-day activities? What is your ethnicity? What is your household's total income? Is anyone in the household receiving any of these benefits…? Does the home have a smart meter?	Context to support analysis

7.2 Resident interviews

Topic guide coverage

Table 20: Core questions asked in the Wave 2.1 resident interviews

Section	Question	Evaluation Question
Information about household	Could you begin by telling me a bit about how you feel about your home? The way it looks, the noise in your home, any issues with the property such as damp or mould, condensation, draughts, inability to heat (or afford to heat) your home to a comfortable temperature?	Context to support analysis
	Without the heating on, is your home a comfortable temperature? How does this vary depending on the time of year? In the past year, did you notice any change in how much heating you use? Why? In our survey you said that you have had or will have some energy efficiency measures installed through SHDF, Is that correct? Which if these have been installed so far, if any? What type of energy saving measures, if any, did your home already have in place before this?	Context to support analysis
	Do you pay for your energy by contract or through a pay-as-you-go or prepayment meter? If contract, what type of contract is it (variable/fixed, term length)? Approximately how much do you spend on your energy bills (per week/month/year)? Did you notice a change in your energy bills over the last year or so? If so, what was the change? How do you feel about your energy bills? Why do you say that? What support, if any, do you receive for paying your energy bills?	Context to support analysis

Section	Question	Evaluation Question
	How would you describe the relationship you have with your SHL? Can you talk me through any positive experiences you have had with your landlord? Have you had any negative experiences with your landlord? Please can you describe them?	Context to support analysis
	Can you talk me through your experience of any other large works you have previously had undertaken in your home by your landlord, local authority or a government scheme? By “other” we mean works not funded by SHDF. How was this experience? What impact did the works have on you?	Context to support analysis
Initial approach and communication about SHDF Wave 1	How did you first find out about the measures your SHL offered to install in your home (e.g. letter, telephone call, face-to-face conversation)? How do you feel about the way you were told about the installation? Why do you say that?	2.1, 2.3
	Could you briefly describe any communication you had with your SHL following the initial contact about the installations, if any? What was the reason for this communication? Are you satisfied with the volume and content of communication you have received from your SHL? Why? Are you satisfied with the outcome of this communication? Why?	2.1, 2.3
Motivations to receive measures	How was the decision to have the measure/s installed made in your household? Who was responsible for making the decision? Did you or anyone in your household seek any support/advice when making the decision (with your SHL, neighbours or friends, or advice online or social media)? If yes, was this helpful? Why? How confident did you feel making the decision? Did you feel able to say no to having the measure/s installed?	2.3
	What did you think the benefits would be of having these measure/s installed? Which of these, if any, were more important to you? Why?	2.3
	Did you think there would be any drawbacks? What drawbacks were/are you worried about, and did they impact your decision to have the measures installed? Why?	2.3, 2.4
	Were you interested in having any other energy savings measures installed, that your SHL did not offer? If yes, please specify? Why were you hoping your SHL would offer these measures specifically?	2.3

Section	Question	Evaluation Question
Installation process (among those who have had measures installed)	First, could you please talk me through your experience of having energy saving measures installed? When did the process first start? What happened next? Did you experience any disruption, issues or difficulties during the installation process? In what way?	2.1
	Have you experienced any immediate concerns with the measures since they were installed? Why do you say that?	2.1
	Could you describe what sort of communication you had with your SHL or installers during the installation process? Was it via letter, telephone call, face-to-face conversation? How did you feel about the way you were communicated with? Why do you say that?	2.1
	What would you say your experience of the installation process has been like overall (positive / negative)? How have you felt about it? Why do you say that?	2.1
	Do you anticipate any disruption, issues or difficulties during the installation process? In what way?	2.1, 2.3
Satisfaction with and understanding of measures	How confident do you feel that you understand how the measures that will be installed in your home will work, and you will be able to use them? Why do you say that? What, if any, guidance or support have you received from your landlord, the installers, or from elsewhere? How helpful was this support? What other guidance or support would you like? Could you talk me through any questions you have about how the measures installed work or how you should use them? What, if anything, could help you to better understand how the measures work and how to use them?	5.1
Awareness of decarbonisation and SHDF	How interested are you in climate change, and the things we can do to reduce the impact we have on the environment? How important is this for you compared to other current issues which impact you? Which issues are more important to you, if any, and why?	Context to support analysis
	How interested are you in the energy efficiency of your home? By energy efficiency, we mean the amount of energy such as gas or electricity, that is needed in your home, for example to use the heating or have the lights on. Why are you interested in how much energy is used in your home?	Context to support analysis

Section	Question	Evaluation Question
	Can you tell me what you know about the government's SHDF? The goals of the funding? What is the funding used for? Who do you think provides the funding to do the works? Who do you think carries out the works?	2.3
	Are you aware of any other government initiatives? Have you made use of any of these? Have they had impact on your energy use? What about on your physical or mental wellbeing? In what ways?	Context to support analysis
Attitudes towards energy saving measures	Aside from other already installed or planned, what other energy saving measures would you be interested in heaving installed, if any? Why/why not? Do you have any plans for other energy saving measures to be installed in your home in the future?	5.6 Contribution claim 10a

Interviewee profile

Table 21 below shows the distribution of the 100 interviews by case studies, resident characteristics, property type and measures installed.

Table 21: Resident interviews achieved by key categories

Category	n	%	Category	n	%
By project case study			**Type of home (b2)**		
Colchester Borough Council	2	2%	Bungalow	16	16%
Longhurst Group	1	1%	Flat, apartment, or bedsit	31	31%
Sanctuary HA	3	3%	House	51	51%
Birmingham CC (digitalisation)	19	19%	Maisonette	12	12%
LB Brent	2	2%	**Property size - number of bedrooms (B7)**		
All excluding case studies	73	73%	1 bedroom	23	23%
Gender (K2)			2 bedrooms	31	31%
Male	29	43%	3 bedrooms	46	46%
Female	68	57%	4 bedrooms	0	0%
Self-describe / Prefer not to say	3	3%	**Property age (B8)**		
Age (K2)			Built before 1919	1	1%
18-24	2	2%	1919-1930	8	8%
25-34	11	11%	1931-1944	8	8%
35-44	20	20%	1945-1964	31	31%
45-54	24	24%	1965-1980	12	12%
55-64	23	23%	Post 1980	4	4%
65-74	14	14%	Unknown	36	36%
75-84	2	2%	**Types of measures installed**		
85+	1	1%	Energy efficient lighting	12	12%
Not available	3	3%	Solar panels	34	34%

Category	n	%
Participant/household disability status (K3)		
Yes – It limits my/their activities all of the time	42	42%
Yes – It limits my/their activities some of the time	20	20%
Yes – It does not limit my/their activities	3	3%
None	29	29%
Prefer not to say / Don't know	6	6%
Ethnicity (K4)		
White	87	87%
Asian / Asian British	3	3%
Black/African/Caribbean/Black British	6	6%
Mixed/multiple ethnic groups	3	3%
Not answered	1	1%
Satisfaction with measures (G2)		
Generally satisfied	40	40%
Neither satisfied nor dissatisfied	6	6%
Less satisfied	49	49%
Prefer not to say/ Don't know	5	5%

Category	n	%
Insulation	81	81%
Windows/ Doors	61	61%
Controls for a heating system, other than a basic thermostat or heater valves	19	19%
Extractor fan(s)	41	41%
Heat pump/communal heat network	20	20%
Draught proofing	20	20%
Ventilation	24	24%
Hybrid boiler	11	11%
Don't know	2	2%
Heating type before installation (D1)		
Central heating - electric	3	3%
Central heating - mains gas	77	77%
Central heating - other	3	3%
Heat pump	2	2%
Open fire or wood burning stove	1	1%
Electric/portable heaters or electric radiators	4	4%
Another method	8	8%
Prefer not to say/ Don't know	2	2%

7.3 Qualitative interviews with supply chain stakeholders

Table 22: Supply chain stakeholder topic guide outline mapped by audience and evaluation area

Theme	Question	Evaluation area
Background on role and responsibilities within their own business	How many years of experience do you have working in the industry of retrofitting housing with energy efficiency measures?	Context to support analysis
	Which area(s) of the UK does your company operate in?	
	What types of installations are you typically responsible for? • Types of measures • Domestic vs non-domestic • New build vs existing retrofit	
Understanding of SHDF and reasons for involvement	Can you talk me through your understanding of the SHDF?	Context to support analysis
	How did you initially get involved in the SHDF?	
	Why did you decide to get involved? How did you find communication from Government/SHLs? What concerns, if any, did you have about participating? (Prompt on uncertainty over long term future of SHDF)	Contribution claim 4a, 4b
	Which other government funded initiatives are you involved in, if any?	Context to support analysis
Activities being conducted as part of SHDF	Which of the following providers have you been working on retrofitting projects for?	Context to support analysis
	Were you aware that these [specify relevant projects] have been funded by the SHDF?	
	What types of measures have you been involved with installing in the social housing properties?	
	What types of buildings have the measures been installed on?	
	Roughly what proportion of your time do the SHDF retrofitting projects take up of your total time spent working?	

Theme	Question	Evaluation area
	Were you involved in helping to select the buildings that received the retrofitting works? If so, how did you contribute to this decision? What factors were considered?	
	Can you talk me through who else you worked with to install these measures? E.g. other plumbers/installers, retrofit co-ordinators, social housing staff, manufacturers etc. If multiple measures were being installed on individual properties were these done around the same time or in stages?	
Communications with SHL	How did you find communication with the SHL? How clear were their expectations? What worked well? What was less useful? Were there any misunderstandings? If so, what impact did these have?	Evaluation question 2.3 Contribution claim 4a Installer objective 1
	Was there anything the SHL requested that you were unable able to do? Why?	Evaluation question 9.2 Installer objective 1
	You mentioned previously working with others in the process of installing the measures. How did you find this process? What issues, if any, did you encounter? How did you resolve these?	
	This project received extra funding digital tools to help with retrofit decision-making and monitoring. Did you have any additional responsibilities or tasks associated with this?	
Challenges and barriers to delivery of installations	To what extent have you been able to complete energy efficiency installations within the allotted timeframes and budgets set out in the scheme requirements?	Evaluation question 2.1 Installer objective 1
	Which types of energy efficiency installations do you find the most challenging to complete as part of the SHDF? Why? And how did you overcome these challenges?	Evaluation question 8.2 and 2.2 Installer objective 1
	Can you talk me through any unexpected problems or difficulties when carrying out energy efficiency installations as part of the scheme? How common were these? What was causing these issues?	Evaluation question 9.3 Installer objective 1

Theme	Question	Evaluation area
	Have you noticed any changes in the types of energy efficiency installations being requested by clients as a result of the SHDF scheme?	Evaluation question 6.2 Installer objective 4
Quality of work	What feedback have you received from clients (social housing providers) and residents about the quality of work carried out as part of the SHDF? How satisfied were they with the work you undertook?	Evaluation question 2.1, 5.1 Installer objective 1
	How have you felt about the quality of the installations? What, if anything, affected the quality of the measure you were able to install?	Evaluation questions in section 5 Installer objective 1
	How did the PAS 2035 quality requirements impact the way you delivered this work, and the quality of the work? Why do you say that? Did the SHDF quality requirements contribute to any challenges undertaking the work? What impact did this have?	Evaluation question 4.2 Contribution claim 6a, 7c Installer objective 3
	Were property improvements made in one period of time or were multiple, separate visits required to install difference measures? If the latter, why was this? What was the impact to the resident and to the contractor?	Evaluation question 4.3 Installer objective 1
Capacity, training and accreditation	Did you have access to the staff you needed to meet the requirements for these projects? If not, what did you do to meet these capacity needs? How did you find this process? What challenges, if any, did you encounter? What caused these and how did you overcome them?	Contribution claim 7a, 5b
	To what extent do you feel you have the sufficient skills in the following retrofitting measures? Why do you say that? What is lacking?	Evaluation question 4.2, 9.1 Contribution claim 6a Contribution claim 7a Installer objective 3
	Which of the following retrofitting installation measures have you attended/received training for? What skill progression, if any, have you noticed in your staff as a result of working on SHDF projects?	
	Are there any types of retrofitting measures that you would like to be involved in delivering but currently don't do?	

Theme	Question	Evaluation area
	In what way, if at all, do you think the requirement for PAS 2035 accredited businesses and Trustmark accredited businesses on SHDF projects benefits the energy efficiency retrofitting industry? Do you think existence of government funded projects with these requirements encourages more upskilling within the industry? Why, why not?	
	Have you been engaged in learning management as part of these works? Can you describe this, and how you have used these learnings? To what extent was this driven by SHDF participation?	
	How easy or difficult has it been to find sufficiently qualified installers/businesses to help deliver the project?	
	Are there any areas (measures/regionally) where resourcing issues are particularly acute?	
Value for money	How suitable do you feel the retrofitting measures installed on the project were for the buildings they were installed in?	Evaluation question 4.1, 8.1 Installer objective 1
	To what extent do you feel the installations were needed for the buildings they were installed in?	Evaluation question 4.1, 8.1 Installer objective 1
	To what extent were clean heat measures installed? How do you feel clean heat installations compare to other types of energy efficiency measures in terms of Value for Money?	Evaluation question 4.3 Installer objective 1
	In what way, if at all, were you able to provide value for money on these projects through any innovative techniques, processes or materials used? How did participation in SHDF drive this? (e.g. PAS requirements, active learning management or other routes). What impacts did this have? To what extent did other government initiatives separate to SHDF (including ECO or the Great British Insulation Scheme, the Home Upgrade Grant), contribute to any innovation?	Evaluation question 8.5 Contribution claim 6a, 7b Installer objective 1
	In what way, if at all, has this project contributed to your retrofit work becoming more cost effective due to e.g. volume of work leading to economies of scale? To what	Evaluation question 8.1

Theme	Question	Evaluation area
	extent did other government initiatives separate to SHDF (including ECO or the Great British Insulation Scheme, the Home Upgrade Grant), contribute to this?	Contribution claim 5a, 7b
	The funding for Wave 2.1 was designed to encourage greater value for money. This was done by funding only larger projects, and allowing projects longer to deliver installations. For the project you worked on, to what extent do you feel the size of the project (in terms of number of properties and amount of work done) and the length of delivery time maximised value for money?	Evaluation question 8.5 Installer objective 1 Contribution claim 5a, 6a, 7b
External factors	In what way, if at all, have the impacts of Covid-19 affected project delivery?	Evaluation question 2.4 Installer objective 2
	In what way, if at all, have the impacts of the UK's exit from the EU affected project delivery?	
	In what way, if at all, have the impacts of high inflation affected project delivery?	
	Have there been any other external factors that have impacted project delivery?	
Realisation of project benefits	How, if at all, will your experience of the SHDF affect the types of projects and the types of retrofit measures you install in future?	Evaluation question 9.2 Installer objective 3
	What tangible benefits resulting from the SHDF scheme have you noticed for your business or for the industry as a whole? E.g. job creation, growth, pipeline of work, confidence in industry To what extent did other government initiatives separate to SHDF (including ECO or the Great British Insulation Scheme, the Home Upgrade Grant), contribute to this?	Evaluation question headline question 9 Contribution claim 7a, 7b Installer objective 3
	In what way, if at all, has the work on SHDF projects contributed to improvements in building standards and safety? To what extent did other government initiatives separate to SHDF (including ECO or the Great British Insulation Scheme, the Home Upgrade Grant), contribute to this?	Evaluation question 8.9 Contribution claim 7b Installer objective 3

Theme	Question	Evaluation area
	In what way, if at all, have you noticed any changes in the level of interest or engagement from clients or potential clients for additional retrofitting measures as a result of the scheme?	Evaluation question 6.3 Installer objective 4
	How has the SHDF impacted your future training priorities? How confident are you that the type of work you carried out on the SHDF project will be available in future? Are you looking to increase the availability of staff (either through taking on new employees or upskilling existing employees) for these activities? Why / why not?	Evaluation question 9.1-9.3 Contribution claim 7a, 4b Installer objective 4
	Have you noticed any negative impacts resulting from the SHDF on your business or the wider industry? What impact have they had? Who is this impacting? Has it affected your interest in future government schemes in any way, or in retrofit work more generally? Why?	Evaluation question 8.10 Contribution claim 7c Installer objective 4
	Has your involvement in these SHDF works meant you've not done work elsewhere? What was this? Why did you make the decision to focus on SHDF works?	Evaluation question 8.9, 9.4, and 9.5 Installer objective 4
	How do you think the SHDF could be improved to better realise its intended benefits?	Evaluation question 9.3 Installer objective 4
Broader view on government schemes and support options	How do you feel about government investment into energy efficiency schemes? Has it helped the industry develop? Why/ why not?	Evaluation question 9.4, 9.5 Installer objective 4
	Other than the SHDF, are you aware of any other government energy efficiency schemes that support your industry? To what extent have you been involved? How do you feel about the different schemes? Is there any difficulty responding to the different needs? Are there capacity issues responding to them all?	
	What challenges does the retrofit industry face in meeting the demand to decarbonise housing?	Evaluation question 9.3 Installer objective 4
	How could the retrofit industry be further supported?	

7.4 Qualitative data collection with stakeholders

Table 23: Topics covered in the TAF Bridge, DP, and DESNZ delivery team focus groups and interviews with senior DESNZ management and the DA

Section	Question	Evaluation question	Audience
Reflections on the programme	How, if at all, do you think lessons learnt or experiences from SHDF shaped the design and early delivery of Wave 2.1?	3.1, 3.4	DESNZ Senior Officials
	For the following changes made to Wave 2.1 programme design compared to Wave 1, do you have any early indication about how each is likely to influence outcomes and impacts? a. Changes in cost caps to include wall type and EPC ratings in Wave 2.1 b. Inclusion of an additional cost cap for clean heat in off-gas grid properties to facilitate low carbon heating further c. Changes to eligible applicant type by allowing direct applications from Housing Associations and charities in Wave 2.1 d. Higher minimum level of co-funding requirement e. Introduction of new requirement of minimum bid size of 100 properties in Wave 2.1. Do you think this has acted as a barrier to smaller organisations? f. Longer delivery period of 30 months g. Funding for digitalisation innovation h. Use of Delivery agent in addition to Delivery Partner i. Expanded role of Delivery Partner to manage both SHDF Wave 2.1 and Home Upgrade Grant j. Increasing scope of TAF Bridge in Wave 2.1 k. Change of powers used to grant funding (Using Grant Funding Agreements)	4.1, 4.3, 4.4, 4.6, 4.9	DESNZ Senior Officials

Section	Question	Evaluation question	Audience
	Do you have any other early indications about the success of the design of the Wave 2.1 programme that you would like to share that we haven't covered?	4	DESNZ Senior Officials
Role and design of the DA	We have seen the outline of the DA's role, but please could you briefly describe in your words, what are the key responsibilities of the DA?	1.7	DA
	In what ways and to what extent, has the design of the DA role for Wave 2.1 built upon learnings from the DA role that Salix has undertaken for PSDS (Public Sector Decarbonisation Scheme)?	3.4	DA
	As far as you're aware, in what ways and to what extent, has the design of the DA role for Wave 2.1 of SHDF built upon learnings from the SHDF Wave 1/Demonstrator delivery?	3.4	DA
	How did the contracting and mobilisation of Salix as the DA progress? What worked well and what could have been improved?	1.7	DA
	How effective do you think the ongoing DESNZ oversight of the DA is? Why/why not?	1.7	DA
DP management	What, if any, lessons are you aware of from Wave 1 that have been implemented in relation to the DP's role and activities on Wave 2.1? What has been the outcome of these?	3.2	DP
	How did the commissioning and contracting of the DP (consortium of PwC, Arup & Turner & Townsend) progress? What worked well and what could have been improved?	1.6	DA, DP
	How is the process of onboarding the DP progressing? What has worked well and what could be improved? Have there been challenges in defining the division of roles and responsibilities between the DP and DA?	1.6	DA, DP

Section	Question	Evaluation question	Audience
	Although it is in the early stages, how well do you think the DP is delivering against their requirements? What is working well and what could be improved?	1.6, 1.8	DA
	How effective do you think DA management of the DP has been to date? What is working well and what could be improved going forward?	1.6	DA
HUG2	To date, how well has it been working for the DA to cover both SHDF Wave 2.1 and HUG2? Why/why not? What have been the advantages and drawbacks?	1.8	DA
	What further future benefits do you expect to the delivery of Wave 2.1 from the DA's role of covering both the SHDF and HUG schemes?	1.8	DA
Pre-competition / competition	To what extent do you think that the marketing of Wave 2.1 was successful in reaching and engaging social housing landlords? What, if anything, could be improved in this?	1.2	DESNZ Senior Officials
	To what extent, did the successful bids match up to expectations of Wave 2.1 ambitions in terms of number, scale & profile?	1.4	DESNZ Senior Officials, IDT
	What do you think were the success factors enabling SHLs to submit a successful bid?	1.1	DESNZ Senior Officials, TAF
	What do you think were the barriers putting off or stopping SHLs from submitting a successful bid?	1.1	DESNZ Senior Officials, TAF
	How satisfied were you with bids for digitalisation innovation in terms of the number, type and overall quality?	8.6	DESNZ Senior Officials,

Section	Question	Evaluation question	Audience
	What worked well and what could be improved in the: a. Application processes b. Attracting a sufficient volume of applications c. Application appraisal processes d. Contracting processes with grant recipients How well did the competition support partner support with this?	1.11	DESNZ Senior Officials, IDT
	In your opinion, how effectively has TAF (SHRA) supported landlords in creating high quality bids? What could be improved?	1.11	DESNZ Senior Officials, TAF, IDT
	Are you aware of any other sources of support that SHLs used in the application process other than provided by SHDF?	2.5	DESNZ Senior Officials, TAF, IDT, DP
	How has the role and offer of the TAF Bridge changed from TAF1 (i.e., from Wave 1 to Wave 2.1)?	1.3	TAF
	What, if any, lessons from Wave 1 have been implemented?	3.2, 3.4	TAF
	In what ways did the TAF Bridge contribute to building awareness of the SHDF Wave 2.1 opportunity amongst Social Housing Landlords (SHLs)? How effective do you think the TAF Bridge's contribution was to this? Which methods were more effective? Did this reach all kinds of SHLs? Was it timely? What could be improved?	1.2, 1.3	TAF, IDT
	What were the impacts of TAF Bridge support for Wave 2.1 applicants? • On their applications • On their preparation for delivering the projects • On early stages of delivery (if known) • On Value for Money	1.3	TAF

Section	Question	Evaluation question	Audience
Scheme management	In terms of overall Wave 2.1 scheme management, what is a) working well, and b) could be improved?	1.5-1.11	IDT
	How did the TAF Bridge liaise/work with the other organisations delivering Wave 2.1? • Working with DESNZ (e.g., management, commissioning process) • Working with the DA (Salix) • Working with the DP (PWC, Arup, T&T), e.g., hand-over of projects What worked well? What could be improved?	1.3	TAF
	In your opinion, how prepared do you think the projects are to carry out the work?	2	TAF
	Based on applications and pre-application discussions with projects, what do you foresee to be the key challenges projects may face or need additional support with?	2	TAF
	How is the DP liaising/working with the other organisations delivering Wave 2.1? What is working well? What could be improved? What impact is this having upon: • Project monitoring • Risk management • Fraud prevention • Project support	1.6, 1.8	DP
Early reflections on delivery processes	How effective has early engagement with projects been? What worked well? What could be improved? • Kick-off meetings • Delivery Confidence Assessments • Collecting data from projects • Payment processes	1.8	DP

Section	Question	Evaluation question	Audience
	Do you have any early indications about what is working well or what could be improved in terms of Wave 2.1 overall programme management? a. Within the scope of DESNZ b. Within the scope of the DA c. Within the scope of the DP	1.11, 1.5	DESNZ Senior Officials
	Do you have any early evidence about what is working well or what could be improved in terms of Delivery Agent activity in supporting SHLs in project delivery?	1.7	DESNZ Senior Officials, IDT
	Do you have any early evidence about what is working well or what could be improved in terms of the Delivery Partner's activity in supporting SHLs in project delivery?	1.8	DESNZ Senior Officials, IDT
	What have been the key ways that the DP has supported the projects thus far? What has been most effective?	1.8	DP
	Do you have any early evidence about what is working well or what could be improved in terms of project monitoring and risk management?	1.5	DESNZ Senior Officials, IDT
	In supporting Wave 2.1 project delivery, what is a) working well, and b) could be improved?	1.5	IDT
	What mechanisms (if any) is the DP using to capture learnings and knowledge about Wave 2.1 delivery? And/or have been put in place by the DA or DESNZ?	3.2	DP
	Are you aware of any instances of learnings being implemented so far? With what impacts?	3.1, 3.2	DP
	Do you have any early evidence about what is working well or what could be improved in terms of mechanisms for capturing programme management learnings and integrating into Wave 2.1 delivery processes?	3.2	DESNZ Senior Officials, IDT, DP

Section	Question	Evaluation question	Audience
	What other suggestions do you have for any improvements to Wave 2.1 processes going forward?	1.5, 1.8	DP
	What, if any, actions are you aware of that SHDF programme team has been able to take or has future plans to facilitate installation supply chain capability and capacity to support project delivery?	1.9	DESNZ Senior Officials, IDT
	Are you aware of any enablers and barriers to supporting the capability and capacity of the retrofit supply chain? If so, what are they?	9.1, 9.2	IDT
	One of the areas we are looking at within the evaluation is understanding qualitative value for money impacts. We have explored benefits (both quantifiable and non-quantifiable in the programme's Theory of Change), but can you also describe what non-quantifiable costs you envisage Wave 2.1 may have? These could be for tenants and their communities, for SHLs, for the supply chain or other stakeholders. For example, the disruption of the works for tenants.	8.11, 8.5	DESNZ Senior Officials
	How are projects progressing in the early stages of their delivery? • Key enablers/barriers • DP support • Variations between projects, stock type, region, etc. • Compared to Wave 1	2	IDT
	Based on what you know so far, how effective do you think the Wave 2.1 design is likely to be in meeting wave objectives? • Scope (cost caps, clean heat, applicant type) • Scale (minimum bid size, co-funding requirement) • Longer delivery window • Digitalisation • Management (inclusion of DA, extended TAF & DP scope)	2.1, 4.1, 4.5	IDT

Section	Question	Evaluation question	Audience
	How, if at all, has this (Wave 2.1 design) built upon lessons from the previous waves to try and improve the design or implementation of Wave 2.1?	3.4	IDT
	At a scheme level, what have been the key risks identified to date in Wave 2.1? How well are they being mitigated?	2.3	DA
Scheme level delivery	To date, how has the DA supported risk management in Wave 2.1? How effective has this been? What has worked well and what could be improved going forward? Probe for examples.	1.5, 1.7, 2.3	DA
	To date, how has the DA supported supply chain management? How effective has this been? What has worked well and what could be improved?	1.7	DA
	At a scheme level, at this early stage, overall, how well do you think Wave 2.1 is progressing against its intended objectives?	2	DA
	At this early stage, how has the DA supported overall progress of Wave 2.1 against its intended objectives? How effective has this been? What has worked well and what could be improved going forward?	2.1	DA
	At this early stage, has the DA yet supported broader strategy and policy at DESNZ through assessment and dissemination of Wave 2.1 learnings and information in any way? How effective has this been? What has worked well and what could be improved? Do you foresee any barriers to this?	1.7	DA
	Do you have any other suggestions for improvements to Wave 2.1 processes going forward? Are there any barriers to improvements?	2.3	DA

Section	Question	Evaluation question	Audience
	Overall, in your opinion, what early indications, if any, are there that the DA is delivering or will deliver benefits in the future in terms of the following: a. Improved learning collation and dissemination, at project delivery, programme and wider DESNZ policy levels b. Driving efficiencies c. Better value for money	1.7	DA
Reflections on benefits	Overall, in your opinion, what early indications, if any, are there that the DA is delivering or will deliver benefits in the future in terms of the following: a. Improved learning collation and dissemination, at project delivery, programme and wider DESNZ policy levels b. Driving efficiencies c. Better value for money	1.7	DA

7.5 Qualitative data collection with SHLs

Table 24: Topics covered in SHL interviews (tranche 1 and tranche 2)

Section	Question	Evaluation questions	Audience
Pre-Application and other retrofit plans	Please could you describe your role and involvement with Wave 2.1 of SHDF?		All
	Had your consortium/organisation carried out or planned to carry out any retrofit or energy performance installations prior to SHDF?	1.1	Successful Tranche 1, unsuccessful applicant
	How did your consortium/organisation first hear about the Wave 2.1 funding opportunity?	1.2	Successful Tranche 1, unsuccessful applicant
	Please can you describe the process of forming your consortium and the rationale for the composition of the consortium?	1.1,1.3	Successful Tranche 1

Section	Question	Evaluation questions	Audience
	What were your consortium's/organisation's motivations for applying for Wave 2.1?	1.1	Successful Tranche, unsuccessful applicant
	Was there anything that made applying less appealing or challenging to comply with?	1.1	Successful Tranche 1, unsuccessful applicant
	How, if at all, did participation in Wave 1 help prepare your consortium/organisation for the Wave 2.1 application?	1.1	Successful Tranche 1, unsuccessful applicant
	How, if at all, did your consortium's / organisation's retrofit plans change as a result of SHDF Wave 2.1 funding availability? How did the Wave 2.1 programme design influence the nature of the retrofit project proposed in your application?	1.4, 4	Successful Tranche, unsuccessful applicant
	What else influenced the mix of energy performance measures (including clean heat) that your organisation selected for the Wave 2.1 project?	1.1	Successful Tranche 1, unsuccessful applicant
	On digitalisation funding a. (If received digitalisation funding) Your project has applied for and received digitalisation funding. How do you expect this to support project delivery? And project impacts? b. (If applied, but did not receive digitalisation funding) Your project has applied for digitalisation funding, but did not receive it. Do you plan to progress this approach through any other means, and, if so, how? Has your consortium/organisation accessed any other government funding to carry out additional energy performance improvements on the same housing stock?	8.6, 8.8	Successful Tranche 1

Section	Question	Evaluation questions	Audience
Application	What worked well in the application process?	1.1	Successful Tranche 1, unsuccessful applicant
	What could be improved in the application process?	1.1	Successful Tranche 1, unsuccessful applicant
	Did your consortium/organisation access SHRA support for help completing the application? If yes, how did SHRA help you put together your application and plan your project?	1.3	Successful Tranche 1, unsuccessful applicant
	[If in Wave 1] Did you also have access to SHRA support in Wave 1? If so, how did that experience affect or compare to your application process in Wave 2?	1.3	Successful Tranche 1
	Were there any gaps in SHRA support? What could be improved about SHRA support?	1.3	Successful Tranche 1, unsuccessful applicant
	Did you use any other sources of support and information to complete your application? Please give examples of how these supported your application.	1.11	Successful Tranche 1, unsuccessful applicant
	Did you understand why your application was not successful? Was the assessment process transparent? What, if anything, would you change or improve about the assessment process?	1.1	Unsuccessful applicant
	What, if anything, did your consortium/organisation learn as a result of the application and assessment process (additional to any pre-existing social housing retrofit knowledge)? What would you do differently if you applied again?	1.1	Unsuccessful applicant

Section	Question	Evaluation questions	Audience
	Have you had any ongoing contact with or support from the TAF (Turner & Townsend) after hearing the outcome of your application? If so, what has this been? And what impact has this had?	1.3	Unsuccessful applicant
	If your Wave 2.1 application had been unsuccessful, to what extent do you think you would have been able to continue with your retrofit plans? How would these have been funded? How would the retrofits have differed, if at all? (Scale, scope, impact)	6.1	Successful Tranche 1
	What do you think has worked well in the post-application contracting process? What could be improved?	1.8	Successful Tranche 1
	How prepared does your organisation feel to carry out the project work? Why?	**2.3**	Successful Tranche 1
	Please can you briefly talk us through the progress of the project to date, and factors that you think are enabling success?	2.3	Successful Tranche 1
	What challenges, if any, have you identified to date or anticipate arising in the project? How does your project plan to overcome these?	2.3	Successful Tranche 1
	How, if at all, has the DP supported your project so far? Please give examples.	1.8	Successful Tranche 1
	How, if at all, has the Delivery Agent (Salix) supported the facilitation of the project delivery to date? Please give examples. What additional support, if any, would your organisation/consortium need from DESNZ / DA, that you are not already expecting to receive?	1.7	Successful Tranche 1

Section	Question	Evaluation questions	Audience
	Is or has your organisation/consortium used other sources of information or support in the early stages of project delivery?	1.8	Successful Tranche 1
	Are there any innovative approaches planned for project delivery? What benefits is this expected to lead to?	8.4	Successful Tranche 1
	Have you seen any early outcomes or impacts from the programme already?	9.1, 9.2, 9.5	Successful Tranche 1
Project delivery	Starting with project planning and preparatory work, how well do you think this progressed? What enabled success? What were the challenges? How were challenges overcome?	1.3	Successful Tranche 2
	Now moving onto tenant engagement, how well do you think this is progressing? What has enabled success so far? What have been the challenges? How have they been overcome?	2.3	Successful Tranche 2
	With regards to tenant engagement, to what extent has your consortium/organisation experienced any tenant drop out so far?	2.3	Successful Tranche 2
	Thinking about procurement of the installation supply chain, how well has this progressed? What has enabled success so far? What have been the challenges? How have challenges been overcome?	1.9	Successful Tranche 2
	On procurement specifically, how well has your consortium/organisation been able to keep costs down in the procurement, management, and use of the required inputs for installations (e.g., the installers, the materials needed)? Why and how?	1.8	Successful Tranche 2

Section	Question	Evaluation questions	Audience
	Thinking about management of the installation supply chain as they deliver installations, how well has this progressed so far? What has enabled success? What have been the challenges? How have challenges been overcome?	1.9	Successful Tranche 2
	In addition to what has been already raised, has your consortium/organisation observed any variation within your project in terms of successes and challenges so far?	2.2	Successful Tranche 2
	How, if at all, has your organisation / consortium's Wave 2.1 project plan changed since we last spoke?	2.1, 2.2	Successful Tranche 2
	How is your consortium/organisation finding the project monitoring process implemented by DESNZ? What has worked well so far and what could be improved?	1.5	Successful Tranche 2
	How, if at all, is the Delivery Partner (a consortium of Turner & Townsend, Arup, and PwC) supporting or facilitating project delivery? If yes, how has this helped effective delivery of the project? If no, why not?	1.6, 1.8	Successful Tranche 2
	What additional support, if any, does your consortium/organisation need from the DP that you don't have?	1.8	Successful Tranche 2
	How, if at all, is the Delivery Agent (Salix) supporting or facilitating project delivery?	1.7	Successful Tranche 2
	Is your consortium/organisation using or did your consortium/organisation use other sources of information or support (outside of the Wave 1 scheme) to deliver the project and install the measures?	2.5	Successful Tranche 2

Section	Question	Evaluation questions	Audience
	How has the design of the Wave 2.1 scheme influenced project progress and the delivery of installations?	4.1-4.8	Successful Tranche 2
	How, if at all, has the requirement for greater scale (minimum bid size of 100 properties) affected delivery? How, if at all, has the cost of retrofit been affected? Have any economies of scale been observed? If so, in what - labour, materials etc.?	4.9	Successful Tranche 2
	How have external factors influenced project progress and the delivery of installations?	2.4	Successful Tranche 2
	Your project has implemented a digitalisation approach. How has this supported project delivery to date?	8.6, 8.7, 8.8	Successful Tranche 2
	With regards to your digitalisation approach, have there been any barriers or enablers to implementation? e.g., tenant refusal to engage. Has this had any impact on project delivery?	8.6	Successful Tranche 2
	When we last spoke, you mentioned using an innovative approach. How has this progressed? Have you used any other innovative approaches in project delivery? What benefits has this led to?	8.5, 8.6	Successful Tranche 2

Section	Question	Evaluation questions	Audience
Retrofit activity since the Wave 2.1 application	Has your consortium/organisation carried out or planned to carry out any retrofit or installations of energy performance measures in the absence of SHDF funding? *[If yes]* How does this differ to what you proposed in your application for Wave 2.1? *[If yes]* How is this funded/how would this be funded? *[If yes]* Did your application to Wave 2.1 have any influence on this activity? For example, in your organisation's capability to formulate these plans/the nature of these plans?	6.1	Unsuccessful applicant
	[If installations have been started] What have the outcomes been from these installations?	6.1	Unsuccessful applicant

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