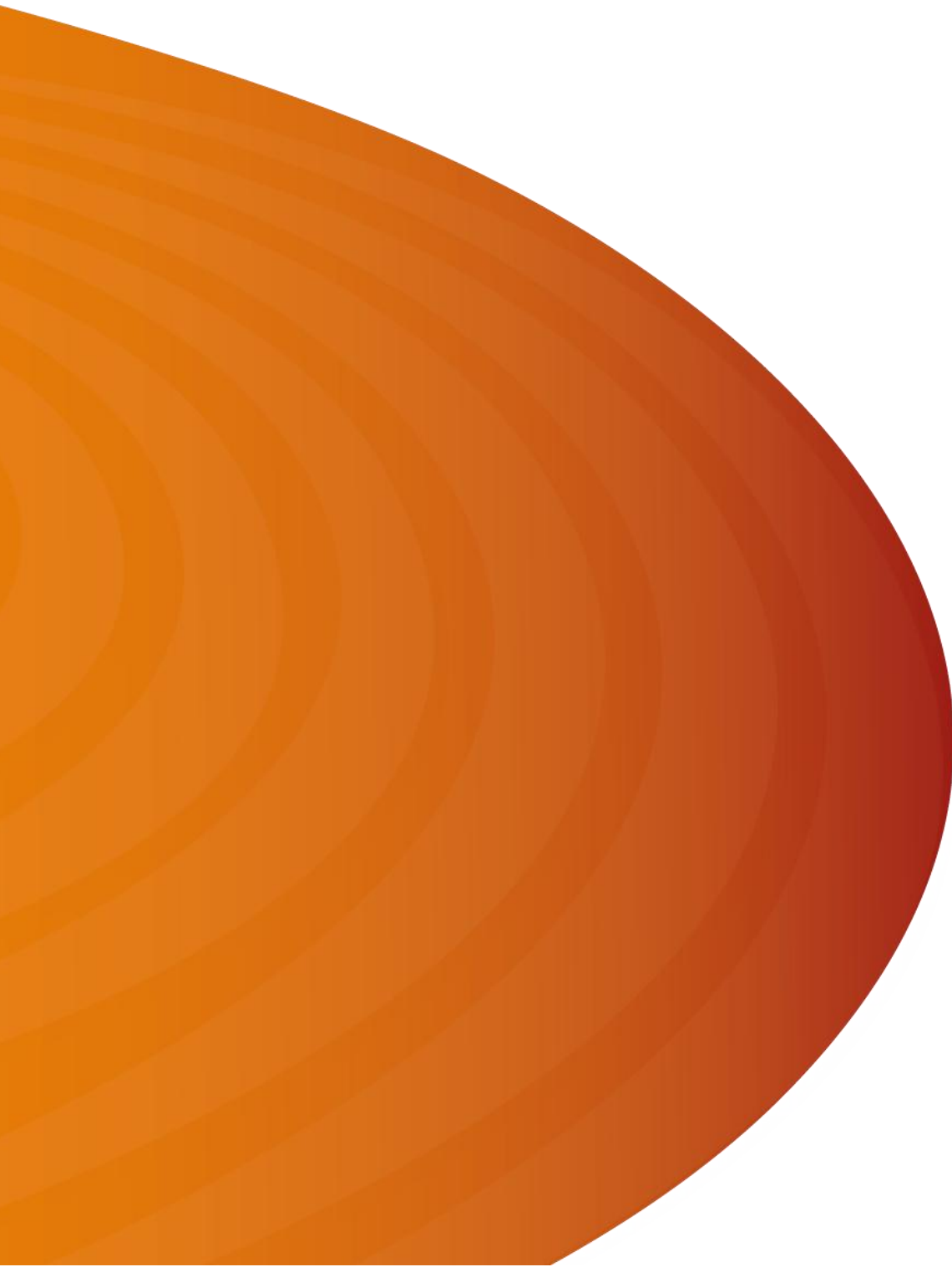


Annual Report: Dec 2024-25

Project SHIELD



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1. Executive Summary

The Smart Heat and Intelligent Energy in Low-Income Districts (SHIELD) project is a Strategic Innovation Fund (SIF) Round 2 Beta Phase initiative led by UK Power Networks and a consortium of partners from different sections. The project partners are: Citizens Advice Essex, Eastlight Community Homes, SP Electricity North West (previously Electricity North West), Essex County Council, Essex Community Energy, Power Circle Projects, Thermify Holdings, UK Community Works CIC, and UrbanChain.

SHIELD aims to make the net zero transition accessible for low-income and fuel-poor households by combining innovative low carbon technologies (LCTs) with a zero upfront cost delivery model that works for tenants and social landlords alike. The project is important because it tackles a long-standing inequality: many low-income households are locked out of the benefits of the net zero transition. SHIELD shows a new, fairer way forward that makes homes warmer, energy systems cleaner, and the transition to net zero something everyone can take part in, not just those who can afford it.

Project Scope

The SHIELD project will design, install, and evaluate integrated low carbon and heat solutions in up to 300 homes. Each deployment combines rooftop solar PV, battery storage, and up to 100 homes will also include Thermify' HeatHub. The HeatHub is an innovative distributed mini-data centre that provides affordable, low carbon heat by capturing and reusing waste heat produced from data processing. The project also trials a new social enterprise Energy Services Company (ESCo) model, that offers zero-upfront-installation costs for tenants and landlords, with capital and ongoing costs recovered through energy sales, grid services, and flexibility revenues.

The Beta Phase will validate the technologies and demonstrate the business model while establishing replicable processes for large-scale rollout. Working with social landlords and local authorities, SHIELD will prioritise fuel-poor and vulnerable households, develop and test tenant engagement strategies, tenant-friendly contracts and navigate regulatory pathways to enable wider roll-out and knowledge transfer.

Progress to Date

During the reporting period (December 2024- November 2025), the project has made progress in several areas.

The first HeatHub pilot has now been installed and is performing well. Early monitoring shows the system is delivering the temperatures the tenants select on their thermostat. The pilot household's electricity bill has fallen by around 20%. The installation also delivers carbon savings, with around 90% of the home's electricity use supplied by onsite solar PV, which reduces electricity-related carbon emissions by roughly 90%. In addition, the HeatHub fully replaces gas consumption for space and water heating and further cutting household carbon emissions.



Figure 1: Thermify HeatHub pilot unit

Learnings have been generated from the first pilot HeatHub installation and modifications for the second HeatHub pilot are underway. These include a redesign of the HeatHub containment methods in the event of a leak and a software update that automates power failure reporting and reconfiguration of heat battery (further information on these can be found in section 2.6).

Social landlord engagement has advanced with Places for People and Golding Homes, alongside project partner Eastlight Community Homes, at advanced stages of signing up. Data sharing agreements are in place and Golding Homes have provided a list of over 100 potential properties for assessment. Places for People are progressing towards sharing data and contract finalisation. To simplify the legal process for social landlord's finance lender review, the project is moving from lease agreements to licence agreements. Eastlight Community Homes has also identified an additional 55 potential properties, although progress is has slowed pending their finance lender's review of revised licence agreements.

The project has also developed and tested simplified tenant contracts and communication materials, with feedback from UK Power Networks' customer panel (managed by Explain), to ensure accessibility and clarity. Tenant recruitment will proceed in batches as each social landlord sign up.

The project is also progressing with metering solutions, grid services development, and integration of the HeatHub with the Home Energy Model (HEM) for regulatory compliance. Engagement with the Department for Energy Security and Net Zero (DESNZ) continues to address regulatory barriers, especially around metering solutions and HeatHub certification.

Delays Encountered

Social landlord contractual and lender approval processes have taken longer than anticipated and external investment funding for both Thermify and Essex Community Energy has been delayed. The impact is that social landlord sign-up, the production of the HeatHubs for the trials and Essex Community Energy sub-contracting an installer to carry out enabling work has all been delayed, pushing back the timeline for tenant recruitment and installations.

To mitigate this prolonged lender approval process, the project has transitioned from lease agreement to licence agreement to streamline the legal processes. SHIELD has also reprofiled project funding to allow for the manufacture of a first batch of HeatHubs. Essex Community Energy entered into a funding agreement in July 2025 for the initial drawdown of funds from a private funding partner, but there has been a six-month delay in drawdown of these funds. The start of solar PV and battery installations is now expected to begin in April 2026.

SHIELD originally proposed a dual-metering design to optimise battery operation and access grid-services revenues. However, Ofgem's current interpretation requires a single customer of record for both meters, which complicates the ESCo architecture and customer experience. In response, the team has adopted an alternative twin-element sub-metering configuration behind a single boundary meter. While this approach necessitates prepayment meters for participating tenants, it is regulatory-compliant, preserves the core business-model advantages (including flexibility and revenue stacking), and is considered scalable for wider rollout.

The project continues to monitor and have dialogue with Ofgem over regulatory developments, particularly the potential reopening of the P379 code modification (a proposed industry code change that would allow two separate customers to take supply through a single boundary meter). This would permit fiscal meters downstream of the boundary meter to supply assets such as electric vehicles (EVs), heat-pumps and solar and battery systems. If progressed, P379 could further streamline metering arrangements for flexibility services and allow SHIELD to revisit more customer-friendly options for asset-level settlement and participation.

Key Learnings to Date

Key learnings to date include the critical importance of early and ongoing engagement with social landlords to clarify technical, legal, and operational requirements. Continuous engagement is also critical to overcoming barriers and ensuring project buy-in. The need for highly simplified, tenant-friendly contracts and communication materials to ensure customer understanding, especially those in vulnerable circumstance. The value of phased, flexible deployment strategies to accommodate regulatory, supply chain uncertainties and the interdependencies of external funding on project activities.

The project has also learned that integrating new technologies and business models into established social housing processes requires significant effort to align expectations and manage risk, adapt technical, commercial, and legal approaches in response to challenges, such as moving to a licence agreement as multiple social housing lending institutions requiring sign off on the lease agreement.

Key Metrics

As estimated at the start of the Beta Phase we expect to see a network impact in avoided reinforcement costs of £367k in the trial, with potential for £497m in GB roll-out up to 2055. Revenue generation is expected to be £5.5m in trial and £4.7bn in GB roll-out up to 2055 from grid services and exports.

Disseminations Activities

Dissemination activities have included regular quarterly review meetings with all partners and stakeholders, presentations at industry events such as UK Power Networks' Net Zero Networks event, Utility Week Live and Energy Innovation Summit (EIS) 2025, and ongoing engagement with social landlords, tenants, and regulatory bodies. The project was also awarded the Data Centre Energy Solution of the Year at the Data Centre Excellence Awards 2025, Waste into Energy Innovation Award at the Energy Awards 2025 and highly commended in the Domestic Flexibility Proposition of the Year category at Utility Week Flex Awards 2025.

The project has also featured in a number of national press articles, one such article was published on the BBC website on the 16 November 2025 ['I heat my Essex home with a data centre in the shed' - BBC News](#).

Collaboration and rollout preparation workshops and meetings have been carried out with partners, local authorities, and funders. The project has engaged with Bankers for Net Zero and Innovate UK's Net Zero Living programme to support commercial scale-up and address non-technical barriers.

The team is actively engaged with the development of the HEM, engaging with the DESNZ Team and appointed HEM development contractors to ensure the HeatHub is appropriately represented in future energy performance assessments.

2. Project Summary

SHIELD is an innovative initiative to make the Net Zero transition affordable and accessible for low-income households by integrating LCTs, innovative distributed data centre heating, solar PV, battery storage, and flexible energy services, providing low-cost heating and electricity to vulnerable customers and addressing the challenge of decarbonising heating in social housing. The project's core aim is to demonstrate and scale up innovative, low carbon home energy solutions for social housing, focusing on heat storage, smart metering, and flexible grid services.

SHIELD is structured around eight work packages (WPs), each targeting a critical aspect of the solution:

- **WP1:** Project Management and Governance
- **WP2:** Technical Development (Heat Storage, Metering, Grid Services)
- **WP3:** Legal and Commercial Arrangements
- **WP4:** Regulatory and Policy Alignment
- **WP5:** Inclusion and Tenant Support
- **WP6:** Social Landlord and Tenant Recruitment
- **WP7:** Deployment and Performance Monitoring
- **WP8:** Commercialisation and Stakeholder Engagement

2.1 SIF Innovation Challenge

The SHIELD Beta Phase Project is directly aligned with the aims of the Ofgem SIF Innovation Challenge 1, specifically "Supporting a just energy transition." Theme 2 "Supporting the decarbonisation of heat and mobility for rural, off gas grid, fuel-poor and those consumer groups with reduced access to opportunities for decarbonisation."

The project is targeting fuel-poor and vulnerable households who are typically excluded from the net zero transition due to high upfront costs of LCTs, with a focus on social housing tenants, and providing them with affordable, low carbon heating and electricity solutions. The project has engaged with five social landlords, in addition to our project partner, Eastlight Community Homes. The project will also look to recruit a small number of customers who privately own their property but are fuel-poor low-income households, to ensure that SHIELD has a wide range applicability.

The SHIELD Project will deploy innovative technical solutions including the integration of the Thermify HeatHub, to provide heating, solar PV and battery storage and commercial models using the ESCo model, which enables zero upfront installation cost for social landlords and tenants, ensuring accessibility and inclusivity. The project is developing and testing new commercial and regulatory pathways to enable scale-up and replication across the UK.

2.2 Problem and Opportunity

2.2.1 The problem we set out to solve

The charity National Energy Action (NEA), estimate that there are 6.1 million UK households in fuel poverty¹, with social housing tenants particularly affected by high energy costs and limited access to LCTs. Traditional home decarbonisation approaches, such as heat pumps and retrofit to bring older homes up to modern thermal efficiency standards, are often expensive, disruptive, or often inaccessible to social housing tenants and those with low incomes. A report by the Young Foundation² found that those households at risk of being left behind in the net zero transition are likely to face higher costs if they can't switch to more efficient systems.

As a result, many low-income and vulnerable households face a double lock-out: they are not able to pay the upfront costs or tolerate disruption, yet they are most exposed to high and volatile energy bills and the health

¹ [What is fuel poverty? - National Energy Action \(NEA\)](#)

² [Our journey to net zero – The Young Foundation](#)

and wellbeing impacts of under-heating. The core problem SHIELD set out to address is how to deliver affordable, low carbon heat and electricity for these households without requiring residents or social landlords to take on prohibitive upfront cost, complexity, or risk.

2.2.2 The opportunity

The barriers described above create a clear opportunity: to enable a decarbonisation pathway that is affordable, low disruption, and deliverable at scale for social housing and other low-income households. National policy and sector evidence consistently highlight that progress depends not only on technology choice, but on solving the “delivery system” around it, including funding, customer experience, supply chain capacity, and landlord risk management. Solutions that reduce complexity and protect consumers are therefore essential to unlocking scale.

SHIELD’s opportunity is to combine proven building blocks (solar PV, battery storage, smart controls and monitoring) with a new novel heat and service proposition, the HeatHub, that can work for households who are least able to self-fund or manage retrofit. These technologies combined with a new commercial model, deliver lower and more predictable energy costs and simpler customer experience.

Through ESCo innovative business models, SHIELD will demonstrate a scalable pathway to decarbonisation for low-income and vulnerable groups. This approach provides third-party financing and removes the upfront cost barrier for tenants and social landlord.

In doing so we are helping ensure vulnerable households can share in the benefits of a just energy transition through lower bills, improved comfort, reduced carbon emissions and increased resilience.

2.3 Performance Against Objectives

The objectives of the project as set out in the Beta Phase application:

- Trial the SHIELD solution in up to 300 households to evaluate SHIELD’s performance, including the Smart Local Energy System (SLES) and HeatHub technologies and the ESCo commercial model
- Review of benefits delivered and impact made to the targeted low-income residents
- Evaluation of alternative LCT options to improve SHIELD’s efficiency, including heat pumps and roof-top wind generation
- Evolution of commercial model, including use of Distribution System Operator (DSO) flexibility services and Peer-to-Peer (P2P) supply options
- Preparation for wider roll-out post Beta Phase, including network impact assessment, market scoping and review of lessons learned throughout Beta Phase.

Despite delays, the project remains aligned with its core objectives of demonstrating the feasibility of the ESCo model and innovative technical solutions for low-income decarbonisation.

2.3.1 Trial the SHIELD solution and evaluate performance

The project has made progress in advancing social landlord sign-ups to enable tenant recruitment. Six social landlords have been actively engaged, with three social landlords at an advance stage, Places for People and Golding Homes. Data sharing agreements are in place with these two, with over 100 homes initially identified as suitable to participate in the trials. Eastlight Community Homes have an additional 55 homes available, although progress has slowed down due to finance lender review, this is pending lender consent on revised licence agreements.

The other social landlords, Orbit Homes, Lambeth Council and Hyde Homes, have a number of technical and legal queries that are outstanding and require the HeatHub to be United Kingdom Accreditation Service (UKAS) certified before providing suitable homes for the trials. The project is confident that sufficient housing stock diversity will be maintained, even if only two or three landlords are involved in the initial phase of the trials.

Social Landlord	No. of homes in UK Power Networks region	No. of homes identified	Status	Comments
Eastlight	14,500	55	Awaiting revised licence agreement	Awaiting revised licence agreement for lawyer and lender review
Places for People	15,930	>100 (TBC)	Data sharing agreement signed	Awaiting data to undertake assessment
Golding Homes	8,500	113	Data sharing agreement and subcontract signed and initial data shared	Subcontract signed 29 September 2025
Orbit Homes	44,000 (UK)	TBC	On hold	HeatHub final specifications and final design configurations are required before signing
Hyde Homes	46,000 (UK)	TBC	On hold	HeatHub final specifications and final design configurations are required before signing
Lambeth Council	33,600	TBC	On hold	HeatHub final specifications and final design configurations are required before signing

Table 1: Social landlord sign-up status

The project has streamlined the legal processes following feedback from social landlords and delays by social landlords' lenders. The project has shifted from lease agreements to licence agreements for equipment installation, granting the provider permission to use the property, but without exclusive possession as per the lease agreement. This change reduces complexity and cost and is expected to facilitate broader social landlord participation. Energy supply agreements have been refined based on feedback from social landlords and ready for deployment once licence agreements are finalised.

Tenant-friendly contracts, inclusive engagement materials and communication materials have been developed and tested with UK Power Networks' customer panel managed by Explain, to ensure clarity and accessibility for participants.

The project is also developing inclusive tenant interfaces and support packages, enabling vulnerable customer to understand complex agreements when signing up and follow up support post installation should they face any difficulties. These were developed with input from Citizens Advice and specialist subcontractors. Training and pilot testing are scheduled for mid-2026.

2.3.2 Review of benefits and impact

The project has successfully installed the first HeatHub pilot system in one of the Alpha Phase pilot homes and has been able to demonstrate the technical feasibility of the integrated solution and performance of the HeatHub.

The HeatHub time to heat performance is consistent with the previous gas heating system, as shown in Figure 2, the data used is taken from the first month of monitoring (December 2024). There is a slight increase in

time to heat compared to the previous system, however this is due to the customer heating their whole home rather just one room.

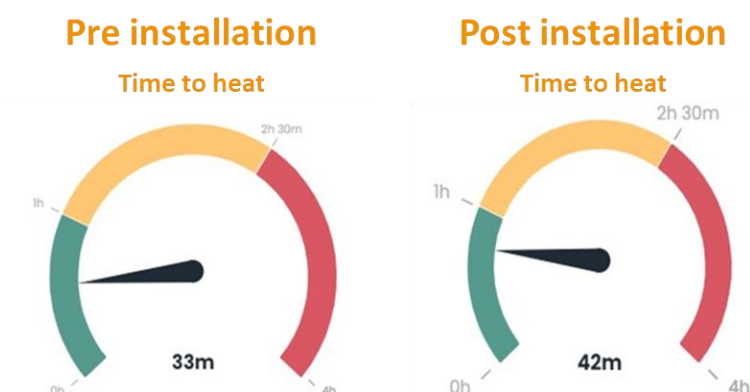


Figure 2: HeatHub time to heat performance

The HeatHub is reliably delivering tenant-set temperatures, the correlation between the temperature requested by the tenant via the smart thermostat (blue line) and the maximum temperature provided by the HeatHub and heat battery (orange line) is shown in Figure 3 (January 2025 to March 2025).

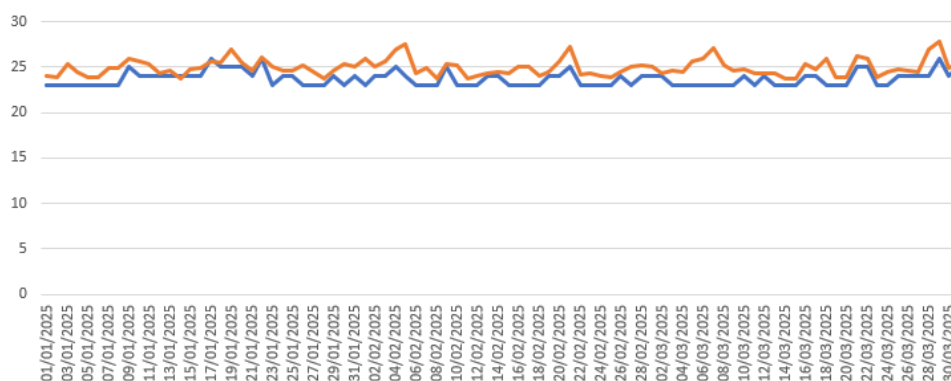


Figure 3: Target temperature and maximum delivered temperature

This shows that the temperature requested by the tenant through their smart thermostat is met by the HeatHub, demonstrating that the system can deliver the required heat requested by the tenant. This confirms that the system delivers the heat the tenant requests, validating its technical performance.

Lessons from the technical issues experienced with this first pilot have informed design improvements for future versions of the HeatHub, further details can be found in section 2.6, and provided valuable insights into customer experience with the installation process, usage and understanding of the system and satisfaction of the system.

Early feedback from the pilot tenants confirms improvements in comfort and in heating and energy bill related anxiety, which supports the project's social impact goals.

Technical performance data from pilot installations and modelling indicates strong potential for energy savings and carbon reductions, consistent with targets set in the Beta Phase application. The project has demonstrated through the pilot deployments that tenants' electricity bills can be reduced by 20%, with over 90% of the electricity consumed by the household generated by the solar PV, with a reduction in carbon by the same amount.

2.3.3 Evolution of the Commercial Model

This section describes two key challenges the project has had to navigate: how to structure the energy metering to make the business model work, and how best to use battery storage to generate revenue that keeps costs low for tenants.

Energy Metering Solution

The project has carried out a detailed review of the energy metering solution required to enable the ESCo to access to grid services and lower energy tariffs.

Initially the project developed a dual boundary meter solution, one boundary meter for the ESCo to manage the consumption of the SHIELD solutions, including battery import and export for associated grid services, and one for the any additional electricity needs for the customers, not provided by the ESCo, as shown in Figure 4.

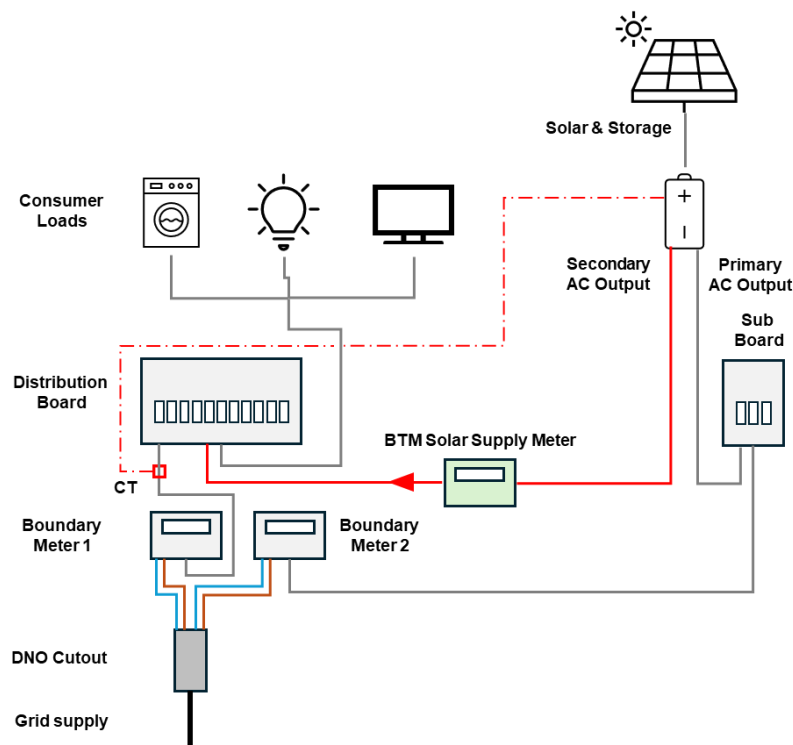


Figure 4: Initial proposed dual meter solution diagram

The proposed solution was presented to Ofgem, their guidance was that the relevant supply licence conditions state that two boundary meters can be installed at a domestic property but both must be registered to a single customer. This prevents the ESCo from managing the second meter as a business customer, limiting access to lower-cost energy and complicating billing and credit arrangements. This interpretation posed a challenge for the SHIELD ESCo model, which relies on having a separate meter for the SHIELD solutions and associated grid services, managed by the ESCo rather than the tenant. Without a code change, this could increase costs for tenants and reduce the commercial viability of the ESCo model. The project team has identified an alternative to the original dual metering solution; a twin-element sub-metering system within a single boundary meter as shown in Figure 5.

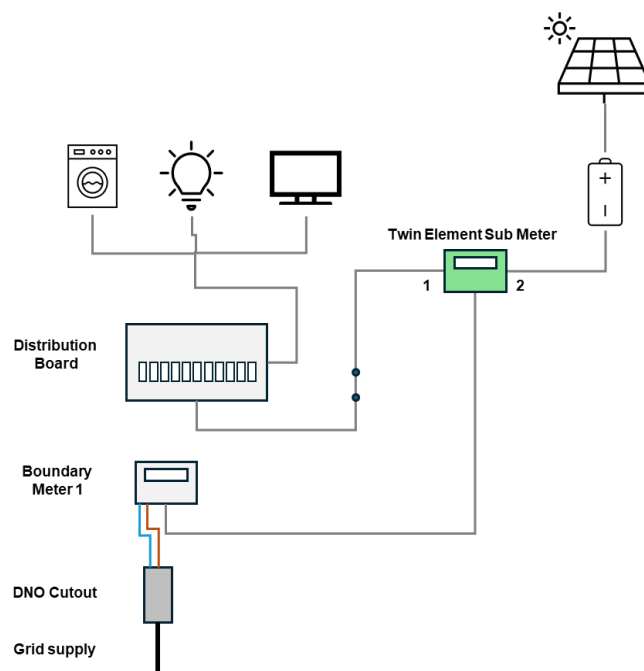


Figure 5: Twin element sub-metering solution diagram

While this approach necessitates prepayment meters for participating tenants, it is regulatory-compliant, preserves the core business-model advantages (including flexibility and revenue stacking), and is considered scalable for wider rollout. However, alternative solutions, such as the reopening of P379 code modification will be monitored throughout the project.

P379 would enable two customers (ESCo and householder) to each take a supply (and export) through the same boundary meter with their respective supplies being billed separately from their own choice of supplier. SHIELD customers would be able to select a supplier to meet the balance of their electricity needs. SHIELD customers would also be able to select their payment method, either prepayment or credit billing, making the system more accessible and tailored to individual preferences.

P379 code modification could offer regulatory and business model advantages for adoption at scale in future roll out by removing the need for a prepay meter and enabling flexibility for customers to choose their own supplier, removing potential barriers for the customer to sign up.

Grid Services

Grid services are a key component of SHIELD's commercial model. By using smart control of battery charging and export, SHIELD aims to generate flexibility revenues that help reduce overall costs and support the "no upfront cost" ESCo approach. During this reporting period (December 2024 – November 2025) we completed a detailed assessment of grid service routes to market, including metering dependencies, revenue opportunities, and partner options for aggregation.

Firstly, the dual metering configuration stood out as an optimal choice, effectively mitigating the pervasive consumer debt risk that has historically hindered funded solar and battery models in the UK. This configuration also establishes a clear and efficient pathway for maximising revenue from grid export and Time-of-Use (ToU) arbitrage.

Secondly, the UK flexibility market, while inherently dynamic and subject to revenue fluctuations, presents significant opportunities for domestic battery assets. Key revenue streams are increasingly derived from wholesale arbitrage and the Balancing Mechanism (BM), complemented by the evolving Demand Flexibility Service (DFS) and new ancillary services like Quick Reserve. The ability to dynamically stack these revenue

streams is paramount for achieving robust and consistent financial returns, mitigating the risks associated with volatility in any single market.

Finally, GivEnergy, chosen as the primary battery supplier for the for the first 50 homes of the project, are well-equipped to support these strategic objectives. Their integrated software platform provides essential tools for optimising solar self-consumption and automating ToU charging, delivering tangible benefits to both tenants and the EScO. Crucially, GivEnergy's comprehensive application programming interface (API) suite and the GivBack service (automated DFS allowing battery owners to earn revenue by exporting stored energy to the grid), are fundamental enablers for sophisticated, automated participation in grid balancing markets, allowing for the implementation of advanced revenue stacking strategies. The project will look at additional partners for greater flexibility and economic benefits throughout the project and into business as usual (BAU).

A comprehensive analysis was also undertaken of four domestic aggregators, GivEnergy (incorporating its recent acquisition, Orange Power), Axle Energy, Levelise, and equiwatt, evaluating their business models, technical capabilities, and market access to inform the project's partnership strategy.

The analysis revealed a fundamental contrast in the strategic approaches of these domestic aggregators. GivEnergy represents a vertically integrated model, combining in-house hardware manufacturing with a developing aggregation service. This creates a closed ecosystem designed to enhance the value proposition of its core product. In contrast, Axle Energy exemplifies a horizontally specialised, technology-first platform model, remaining hardware-agnostic to focus exclusively on maximising market access and revenue generation for any connected asset. The offerings from Levelise and equiwatt were found to be strategically misaligned with the SHIELD project's core objectives due to proprietary hardware requirements and a narrow focus on simple demand response, respectively.

Analysis for maximising revenue from grid services and electricity export was also carried out in this period. The analysis confirmed that the project's long-term financial viability and scalability are contingent upon three strategic pillars:

- An innovative technical configuration to de-risk the business model
- A dynamic commercial strategy to navigate a volatile energy market
- A deep understanding of a transformative regulatory landscape

Based on the assessment, a phased strategic approach is to be taken forward for the SHIELD project to navigate the complexities of the current market intelligently.

- Implement a phased route-to-market for grid services
 - Proceed with GivEnergy's aggregation offering as detailed above, initially leveraging the automated capabilities of the GivEnergy GivBack service to secure foundational revenues with minimal operational overhead.
 - Transition to or integration with Axle Energy for the subsequent 250 homes. As the fleet of assets scales, the project should transition to a specialist virtual power plant (VPP) partner capable of exploiting the full GivEnergy API suite for advanced, algorithm-led optimisation to maximise returns. Axle's specialised focus, superior market access, and hardware-agnostic platform represent the best-in-class solution for maximising the long-term revenue potential of the wider trial portfolio and beyond.
- Adopt a dynamic, aggregator-led revenue stacking strategy
 - The commercial focus should be on the BM and wholesale arbitrage as the core revenue pillars, supplemented by opportunistic participation in ancillary services like Quick Reserve and the DFS.

This strategy enables a secure and stable footing before evolving to embrace a more aggressive and technologically advanced platform designed for maximum value extraction.

By implementing these recommendations, the SHIELD project can establish a robust and profitable ESCo model, delivering significant value to tenants and landlords while creating a scalable template for the decarbonisation of residential housing across the UK, strategically positioned to thrive in the future of the UK's energy system.

2.4 Preparation for wider roll-out

2.4.1 HeatHub Standard Approval Process (SAP) Certification

During this period the project team engaged with DESNZ, Building Research Establishment (BRE) and the DESNZ appointed HEM development team. The purpose of this work is to ensure the HeatHub can be appropriately represented in future home energy assessments and, in turn, reflected in Energy Performance Certificate (EPC) outcomes.

Early discussions with BRE identified that Appendix Q of SAP, which provides a means whereby validated individual branded product performance, does not currently provide a suitable category for assessing a technology like the HeatHub. This makes a robust Appendix Q assessment difficult. In parallel, DESNZ and BRE confirmed that Appendix Q is expected to be superseded by the HEM from 2026. On that basis, the project's recommended route is to focus on securing recognition through HEM rather than investing effort in an approach that is likely to be time-limited.

For the purposes of the Beta Phase trial, social landlords have confirmed they are comfortable proceeding without formal SAP certification for the small number of trial installations. They do not expect these limited deployments to materially affect their overall housing stock reporting. However, formal recognition will be important for scale-up. Social landlords care about this because EPC outcomes affect their regulatory compliance and reporting obligations, and can influence access to financing and energy efficiency retrofit funding so they need confidence the HeatHub will be recognised correctly in the assessment methodology.

The project has therefore shifted effort to HEM engagement, working with relevant HEM contractors so that the HeatHub is represented appropriately when the HEM EPC module is available in draft (currently anticipated in January 2026). Following this, the HeatHub and its impact on energy performance modelling of homes under HEM will be able to be assessed. This will reduce regulatory and adoption risk for any wider rollout.

2.5 Project Outputs, Outcomes, and Innovative Aspects

The outputs and outcomes are tracked through the key milestones of the project which are outlined in the table below.

Work Package (WP)	Deliverable	Description	Status
WP1	D1.1	Project plan	Complete
WP1	D1.2	Quarterly presentation	In progress
WP1	D1.3	Commercialisation strategy/regulatory barriers documents	In progress
WP1	D1.4	Annual reporting	In progress
WP1	D1.5	Mid-point report	Not started
WP1	D1.6	Beta Phase show and tell	Not started
WP2	D2.1	Technical capacity report & automated data collection	Complete
WP2	D2.2	Technology evolution trial report	In progress

WP2	D2.3	Tests results performed on Thermify/Kensa ground source heat pump (GSHP) interface	Not started
WP2	D2.4	Grid service assessment	In progress
WP3	D3.1	Tenants' contract pack	Complete
WP3	D3.2	Contract suite & P2P supply offering	Complete
WP4	D4.1	Appendix Q	Complete
WP4	D4.2	SAP11 (Home Energy Model) impact assessment	In progress
WP5	D5.1	Support package and inclusive tenant interfaces	In progress
WP5	D5.2	Tests results of alert services	Not started
WP6	D6.1	Contracts signed for social landlords	In progress
WP6	D6.2	Contracts signed for first wave of tenants	Delayed
WP6	D6.3	Contracts signed for second wave of tenants	Not started
WP7	D7.1	Energy services delivery quarterly reports	In progress
WP7	D7.2	Tenants' surveys and questionnaires designs	Delayed
WP7	D7.3	Wave 1 installation & report	Delayed
WP7	D7.4	Wave 2 installation & report	Not started
WP7	D7.5	Final report on all stakeholder engagement feedback from trials	Not started
WP8	D8.1	Detailed collaboration and roll-out preparation roadmaps	In progress
WP8	D8.2	SHIELD multiple occupancy buildings (MOBs) assessment	Not started
WP8	D8.3	Inputs for local area energy plan (LAEP) update, Energy Company Obligation (ECO4) accreditation & health service customers	Not started
WP8	D8.4	Local P2P market scoping	Not started
WP8	D8.5	Collaboration report and energy market price forecasts	In progress
WP8	D8.6	Scale-up assessment for Distribution Network, funder and other stakeholder	Not started

Table 2: SHIELD deliverable status

2.6 Difficulties and Delays Encountered

During this reporting period, SHIELD experienced delays primarily linked to social landlord onboarding, the timing of external funding for project partners, and regulatory clarity on domestic energy metering. Together, these factors have pushed the start of the first wave of solar PV and battery installations to April 2026.

2.6.1 Social landlord onboarding and lender approvals

Social landlord sign-up has taken longer than planned as social landlords also require their lenders' approval for the proposed legal structure for equipment installation into their homes, as the lease grants the EScO

exclusive right to occupy. This extended the time needed to finalise agreements and hence delayed tenant recruitment.

To reduce this barrier, the project revised the installation agreements from a lease structure to a licence structure, granting the ESCo permission use without exclusive possession. This approach is simpler for landlords to adopt and is expected to reduce (or remove) the need for lender consent, supporting faster onboarding.

2.6.2 HeatHub production readiness and certification information

Several landlords have requested additional information about the HeatHub certification, which can only be provided upon completion and independent testing of the production version of the HeatHub. At the same time, progress toward a finalised production version of the HeatHub was slowed by delays in external investment funding for Thermify.

To maintain momentum, the project team reviewed the minimum requirements for the initial installation wave and reallocated project funding to support the production and deployment of an initial batch of HeatHubs. This reduces dependency on the timing of external funding drawdown for early trial delivery and support the project to proceed without any further disruption.

This delay has also impacted the timing of the first wave of Thermify HeatHub installations which are now expected in May 2026 but the project overall remains on track and to meet its objectives.

2.6.3 Private funding drawdown and solar PV/battery design finalisation

There was also a delay in the initial drawdown of external investment funding secured by Essex Community Energy (funding agreement entered in July 2025). This delayed aspects of final design and procurement planning for the solar PV and battery solution and contributed to slower progress in social landlord sign-up.

These delays have impacted the timing of the first wave of solar PV and battery installations which are now expected in April 2026 but the project overall remains on track and to meet its objectives.

2.6.4 Domestic energy metering regulatory challenge

A key regulatory challenge has been the energy metering arrangement required to support the ESCo model and access to grid services as detailed in Section 2.3.

2.6.5 HeatHub technical issues identified through the pilot

The HeatHub pilot installation surfaced several technical issues, typical of early deployments, further details can be found in Appendix A. The following sections provides a summary of these issues, the root cause and the resolution.

2.6.6 Oil Leak

The pilot HeatHub uses oil as the primary heat transfer fluid and a leak developed within the heat transfer system, resulting in oil escaping from the HeatHub. During this incident period the household experienced a partial reduction in radiator heating performance.

The root cause of the incident was traced to a failure within the oil-based heat transfer circuit in the prototype. The prototype design lacked sufficient containment to prevent spilled fluid from impacting the surrounding environment.

The production design has been updated to remove oil from the system and use water as the transfer fluid, and the HeatHub chassis and bunding approach has been redesigned to provide improved containment.

2.6.7 Heat battery failure due to short-duration power cuts

A localised power outage caused the household to lose supply for a short period, when power was restored the tenant experienced loss of heating and hot water.

It was identified that the power outage had reset the heat battery software configuration to factory settings but that the system did not independently register the outage or could not automatically reconfigure the heat battery.

A monitoring and control system that automatically detects outages, notifies the tenant, and supports remote and automatic reconfiguration to restore normal operation has been developed and implemented, with the heat battery configured to provide uninterrupted heat and hot water supply in the event of power failure.

2.6.8 Heating control failure

The pilot home tenant reported that attempts to adjust the heating via the smart thermostat (Switchee) produced no response, the heating continued to operate at full output.

Investigation identified a failure in the smart thermostat interface that prevented control commands being communicated to the system correctly. The issue was addressed through a system reset performed by the Switchee technical team and normal thermostat functionality was restored.

A standard operating procedure will be established for customer support teams to apply an immediate thermostat reset where similar symptoms are reported. This procedure will be incorporated into call centre handbooks and training as part of rollout phase.

2.6.9 Fluctuating hot water temperature

The pilot home tenant reported unexpected fluctuations in hot water temperature.

Investigation confirmed that all Thermify system and components were operating within specification and monitoring and control signals were active and performing as intended. A controlled volume test of the existing hot water cylinder showed a marked decline occurred after the initial 50 litres of hot water reached setpoint temperature. The system cylinder setpoint was increased from 50 °C to 60 °C, resulting in a more consistent thermal output.

The recommendations are to maintain the revised setpoint temperature and continue monitoring system performance and conduct follow up testing to verify the effectiveness of the adjustment and determine whether additional intervention is necessary. The cost effectiveness of replacing the hot water cylinder as part of the SHIELD Energy System to significantly reduce the likelihood of this category of failure occurring will also be reviewed.

2.7 Informing Future Thinking

These challenges have collectively informed important principles for undertaking future innovation projects effectively:

- Establish contingency plans early on where external investment funding is required:
 - Projects that have external investment funding should identify activities that are reliant on this funding and establish a contingency plan should funding be delayed. This will ensure that impacts on delayed funding are minimised and the project can implement its contingency releasing project funding to support the continuation of the project until such time that external funding is received
- Allocate realistic timescales for external engagement:
 - Projects deploying equipment into third-party housing stock should allocate substantial time for relationship building, governance establishment and legal alignment
 - Early engagement with clear communication about needs and value, with phased approaches that build trust progressively are essential, understanding and mapping those who have

approvals and building those into the plan early on. Close alignment with product and engagement workstreams is also essential to make sure any activities are focused on the items that are likely to create the desired outputs

- Design for simple, rapid onboarding for trial:
 - Projects that are trialling solutions installed in tenanted homes should keep legal constructs lightweight. Prefer low-friction arrangements over structures that trigger third-party consents. Provide template packs and clear decision trees to shorten onboarding cycles
- Technology readiness with field pilots:
 - Projects that are trialling new to market solutions should use pilot homes/sites to uncover problem early and inform the production design. Pilots help refine technology, improve customer experience and reduce risk before wider rollout.

These learnings are being applied appropriately through the project and have evolved through the first year.

3. Knowledge creation and dissemination

In the first months of the project, key internal and external stakeholders were identified, and a stakeholder engagement plan was developed to guide outreach, communication and dissemination. This plan was the basis of our dissemination activities in Year 1. During Year 1, the main dissemination activities have included:

- Targeted meetings with local authorities and social housing providers to introduce the project and gather insights on relevant workstreams
- Presenting at industry events and conferences, where UK Power Networks and project partners presented SHIELD updates, strategic insights, and emerging findings. Engagements have included:
 - Industry events such as UK Power Networks' Net Zero Networks, Utility Week Live, and the Energy Innovation Summit
 - Events such as the FutureBuild 2025
- External communication channels, including the SHIELD website and press releases, have supported wider dissemination of pilot phase of the project, such as publishing this report and exposure with national press ['I heat my Essex home with a data centre in the shed' - BBC News](#).

Looking ahead to Year 2, we plan to disseminate learnings following the first trial to share findings and provide ongoing updates to stakeholders.

The project embraces continuous learning in the development of landlord and tenant contracts, the development of ESCo services and the deployment of the technical solutions being delivered but also to identify improvements on how the team coordinates the activities through delivery.

A regular cadence of retrospective reviews empowers the project team to identify areas for improvements and self-organise to explore solutions to those areas. Even more important with a large consortium of partners providing a variety of capabilities and working from different organisational cultures, locations, and experiences.

To support this a lessons learned log is maintained and some of which is available in Appendix A.

3.1 Lessons Learned and Insights Gained

During the relevant period of the SHIELD Beta Phase, the project generated a body of knowledge about the technical, operational, and social dimensions of deploying innovative low carbon energy solutions in low-income and social housing contexts. Several key lessons and insights emerged from both the project's approach and the innovations trialled:

- Regulatory:
 - Complexity of energy metering solutions and regulatory requirements necessitated close collaboration with Ofgem and technical partners. The team is contributing to the development of the HEM, seeking to ensure that the Thermify solution would be appropriately represented in future energy performance assessments, and engaged with HEM contractors, City Science and Scene, to support the consultation process. The team learned that regulatory hurdles, such as Ofgem's interpretation of dual metering rules, could significantly impact project timelines and required both technical workarounds and proactive engagement with regulators
- Early and continuous stakeholder engagement is essential:
 - The project found that legal, financial, and operational requirements from social landlords were more complex and variable than anticipated ranging from buy out models and liability flow to certification of new technologies. Early dialogue helped surface these issues, however, have still caused delays in sign up, this also highlighted the need for even more proactive, ongoing engagement. The project also learned that the integration of new technologies and business models into established social housing processes requires significant effort to align expectations, manage risk, and address legacy system constraints
- Pilot installation:

- The pilot installation demonstrated that the HeatHub could reliably deliver tenant-set temperatures, along with solar PV and battery, could provide meaningful energy bill savings. However, the absence of a finalised, certified production version of the HeatHub created a backlog of technical and contractual queries from social landlords, highlighting the need for robust product development and certification processes before large-scale rollout. Issues such as oil leaks in prototype HeatHubs, heat battery resets after power cuts and smart thermostat failure highlighted the complexity of integrating multiple technologies in real homes. These are exactly the kind of issues that a rigorous pilot process is designed to surface and resolve before scale-up. Each problem has informed design improvements; these refinements will enhance reliability and consumer confidence in future deployments
- Flexibility and iterative adaptation are key to innovation:
 - The SHIELD team learned that rigid project plans are not compatible with the realities of multi-stakeholder, multi-technology innovation. The project has adapted its legal model (moving from lease to licence), and technical solutions, such as energy metering adaptations, in response to real-world constraints and feedback. This iterative approach allowed the project to keep moving forward despite delays and unforeseen challenges
- Project activities reliant on external investment funders:
 - Some of the SHIELD project partners are reliant on external investment funders for part of the work for SHIELD and this has had a severe impact on the progress of the project. It is recommended that early identification of activities that are impacted by investment funding delays and the costs associated with those activities. Mitigations should be a review of the project funding to establish if project funding can be released to support activities whilst waiting for release of external funding.

4. Intellectual Property Rights Generation

During the Beta Phase, the SHIELD project has generated a body of new knowledge, methods, and practical tools that qualify as Foreground Intellectual Property Rights (IPR) under the SIF Governance Document. Foreground IPR includes any technical, commercial, regulatory, legal, or user-engagement material created within the project that did not previously exist. This section summarises the Foreground IPR developed to date and the approach for sharing this across networks.

Although the project is still progressing toward large-scale deployment, several important assets have already been created during the reporting period.

- HeatHub design refinements have been developed through the pilot installation, these are:
 - Replacement of the oil-based heat transfer system with a redesigned water-based configuration
 - Updated chassis, bunding, and containment design to prevent leaks and improve safety.
 - Monitoring and control enhancements enabling automatic outage detection and remote reconfiguration of the heat battery
- Twin-element metering configuration created as a regulatory-compliant alternative to the original dual-meter concept. This includes SHIELD-developed integration logic for billing, asset control, solar PV/battery optimisation, and ESCo operation
- Grid-services integration approach has been identified, including a multi-stage revenue-stacking strategy, technical partner evaluations, and system optimisation methods for BM, wholesale arbitrage, Quick Reserve, and DFS participation
- SHIELD-specific ESCo commercial model have been developed, including:
 - Billing architecture for fixed-fee heating and discounted electricity supply
 - Credit-risk mitigation design building on metering refinements
 - Revenue-sharing mechanisms for grid services and export income
- Revised SHIELD installation and participation structure, including:
 - The shift from a lease-based installation model to a licence-based approach to remove the need for lender consent
 - Updated contract suite covering social landlord agreements, tenant Energy Supply Agreements, and data-sharing arrangements
- Inclusive tenant-support materials, including accessible contract packs, customer-friendly explanations of billing and system operation, and enhanced onboarding processes developed through testing with Explain's customer panel and Citizens Advice Essex
- Social landlord engagement and onboarding frameworks, including property triage methodology, governance processes, and templates for accelerated approval and sign-off
- Market and system modelling outputs, including aggregator capability assessments and grid-service revenue modelling used to shape the route-to-market strategy.

Together, these form a substantial portion of the project's Foreground IPR and will support replication, regulatory development and sector learning.

In line with the Collaboration Agreement and SIF Governance arrangements, all partners remain committed to sharing learning across networks to maximise consumer benefit. An Intellectual Property Register has been established and will be maintained throughout the project. At this stage, there are no outputs that Ofgem has specified as exempt from sharing. As relevant foreground IPR is created in subsequent phases, it will be documented and shared across networks agreed dissemination channels to support replication and industry learning.

5. Data Access Details

5.1 Data and Insights Produced

During the Beta Phase, the SHIELD project is generating a range of data and insights. The insights and data produced in this reporting period include the following:

- Performance data from the HeatHub, solar PV, and battery storage pilot installation, including temperature tracking, energy consumption and system reliability
- Automated data collection frameworks and quarterly energy services delivery reports
- Data on grid export and DFS
- Energy metering solutions, including technical integration and regulatory compliance insights
- Insights into contents and format of tenant-friendly contracts, inclusive communication materials and feedback from tenant engagement panels
- Contract suite including social landlord agreement such as lease/licence agreements, and data sharing agreements and tenant agreements such as Energy Supply Agreements.
- Data on social landlord participation, property assessments, and tenant recruitment, including demographic insights from engagement activities.

5.2 Where Data and Insights Can Be Found or Requested

- UK Power Networks Innovation Website:
 - All key project documents, updates, and outputs are published on the [UK Power Networks Innovation SHIELD page](#), including detailed reports, presentations, and ongoing insights as the project progresses
- ENA Smarter Networks Innovation Portal:
 - The project is also listed on the [ENA Smarter Networks Innovation Portal](#), which provides an overview of SHIELD, links to published documents, and access to related innovation initiatives across the UK energy networks sector
- Dissemination Activities:
 - Insights and findings have been shared at industry events such as UK Power Networks Net Zero the Energy Innovation Summit 2025 and Utility Week 2025. The project also plans to publish regular updates on the SHIELD website and project partner websites. Knowledge dissemination will be arranged following the trial to share findings and provide ongoing updates
- Open Data and Requests:
 - In line with the project's commitment to knowledge sharing and SIF governance requirements, data assets are catalogued and made available via the UK Power Networks Open Data Portal [Open Data | UK Power Networks](#) (where possible). Requests for specific datasets or further information can be directed to the project team via the contact details provided on the UK Power Networks Innovation website.

6. Route to Market / Business as usual

6.1 Integration into BAU Practices

The project is actively working towards integration into BAU practices through strategic alignment with key business planning activities and the development of a comprehensive commercialisation strategy.

The Beta Phase is designed with a clear pathway to BAU integration and large-scale commercial deployment, both within the lead network (UK Power Networks) and across other networks. The project's approach to route-to-market and BAU adoption is grounded in the lessons learned from the Beta Phase, the technical and commercial readiness of the innovation, and the evolving regulatory and policy landscape for low carbon energy solutions in social housing and other housing tenures.

To strengthen BAU integration, the project will map SHIELD processes against UK Power Networks' existing planning, forecasting, flexibility procurement and connections workflows. This ensures the solution can be lifted from the innovation environment and placed directly into repeatable operational processes. SHIELD will provide quantifiable benefits, such as reduced peak demand, deferred reinforcement, lower consumer energy bills and indirect carbon savings, supporting UK Power Networks' strategic priorities around affordability, decarbonisation and customer vulnerability.

6.2 Lead Network Processes, Products, and Services:

Within UK Power Networks, the SHIELD project will align with current processes, products, and services and look how it can help develop new thinking.

- Connections, Network Planning and DSO Flexibility Team collaboration:
Close collaboration with UK Power Networks' Connections and DSO Flexibility Team enables the project team to:
 - Identify existing processes and where the project can provide immediate and future support
 - Understand integration requirements and business workflow dependencies
 - Ensure the innovation aligns with regulatory submission requirements
 - Strengthen understanding of how smart energy management systems are managing peak loads, enabling efficient assessment of reinforcement requirements that enable avoided or deferred reinforcement and delivering long-term financial efficiencies for network operation.

6.3 Steps and Additional Work Required Before Adoption

- Complete Beta Phase installations:
 - Finalise trial installations, gather robust performance and customer satisfaction data
- Regulatory alignment:
 - Secure full HEM certification for Thermify and define the most appropriate energy metering solution for scale up that meets regulatory needs. The project is working closely with the HEM development team to ensure that the Thermify solution is appropriately represented in future energy performance assessments, which will be critical for landlord buy-in and EPC compliance
- Commercial model refinement:
 - Finalise and validate the ESCo model, including third-party financing and revenue-sharing mechanisms
- Stakeholder engagement:
 - Continue onboarding additional social landlords and scale up tenant recruitment, refining the tenant and landlord engagement processes
- Knowledge transfer:
 - Disseminate lessons learned, contract templates, and technical documentation to other networks and sector partners.

The team is also developing a robust commercialisation strategy, including milestone-based funding, phased deployment, and the aggregation of demand to attract institutional finance.

6.4 Likelihood of Large-Scale Deployment

SHIELD has been designed with scale in mind: the technical package (solar PV, battery storage, smart controls and HeatHub) and the ESCo delivery model are intended to be replicable across different housing types and regions, and transferable beyond the UK Power Networks' licence areas.

Early engagement with major social landlords, local authorities, and financial partners, such as Bankers for Net Zero, increases the likelihood of national rollout. Engagement with multiple social landlords and local authorities has helped test the practicality of the delivery approach, including contracting, onboarding and tenant engagement. In parallel, discussions with financial partners (including social and institutional finance stakeholders) are supporting the investment case for expanding beyond the initial trial portfolio.

External interest in the project has increased, including following national media coverage in November 2025, which has supported awareness among individuals wanting to participate, potential partners and stakeholders. The Beta Phase will provide the operational and performance evidence needed to confirm scalability, refine the route-to-market model, and support decisions on broader rollout.

6.5 Recommendations for Further Exploitation

To further exploit the outcomes of the project, the project team recommends:

- Regulatory engagement collaborating with DESNZ, Ofgem, and sector bodies to streamline regulatory pathways and promote supportive policy changes
- The development of standardised, tenant-friendly contracts and onboarding materials
- Leveraging financial innovation by working with institutional investors and social impact funds to scale the ESCo model
- The team also recommends leveraging the project's data and insights to inform future iterations of the HEM and to support the development of new flexibility services and grid products.

6.6 Commercial Readiness Levels (CRL)

The project has brought forward the commercialisation strategy workstream to support the requirements outlined in the project conditions. As such we are progressing through commercial readiness levels outlined in the Beta Phase application in alignment with technical development:

- Thermify HeatHub:
 - Moving from CRL 7 (pilot demonstration) toward CRL 8 (pre-commercial deployment) as pilot and trial data and regulatory approvals are secured
- ESCo model:
 - Initially validated at pilot scale; progressing toward commercial readiness as financing and legal frameworks are refined throughout the project trials
- Solar PV/battery integration:
 - Already at high commercial readiness; SHIELD's innovation is in the aggregation for the provision of grid services and business model.

6.7 Updates to Procurement and Utilisation Plans

To enable procurement and utilisation of the innovation across Great Britain and internationally, the project is standardising its technical, commercial, and legal frameworks, making them available through direct engagement with sector stakeholders.

Power Circle Projects has successfully tendered to be a supplier under the Procurement for Housing SHED4 (Social Housing Emerging Disrupters) procurement framework which enables any public body or charity, including housing associations to contract with Power Circle Projects or its associated companies (including Essex Community Energy CIC) for smart energy services such as SHIELD.

The project will work with sector procurement bodies (e.g., Fusion21, Procurement for Housing) to enable wider adoption through inclusion of the SHIELD services in their solution offerings.

The project has reprofiled internal project funding to enable the manufacture of the first batch of HeatHubs. This ensures early production capacity and protects the commercialisation timeline while external capital is being secured.

6.8 Commercialisation Considerations of the Proposed Solution

The Project consortium has made extensive and deliberate considerations to support the commercialisation of the SHIELD solution. This includes developing a scalable ESCo commercial model that incorporates predictable heat-as-a-service pricing, credit-risk mitigation, and a multi-stream revenue-stacking strategy built on wholesale arbitrage, the BM, DFS and emerging ancillary markets.

The consortium has also refined and standardised contractual frameworks to ensure that the solution can be rapidly procured and deployed by social landlords without lender-approval delays.

Technical and engineering readiness has been advanced through production-oriented improvements to the HeatHub, informed by pilot learnings, ensuring reliability and reducing operational risk at scale.

Regulatory readiness has been proactively addressed through close engagement with DESNZ, BRE and the HEM development team, ensuring the HeatHub will be appropriately represented in EPC and future HEM assessments, which is essential for landlord adoption.

The consortium has also progressed financial readiness by engaging investors, including Bankers for Net Zero, to shape scalable financing structures suitable for commercial roll-out.

Market access has been strengthened through Power Circle Projects' successful admission to the Procurement for Housing (PfH) Social Housing Emerging Disruptors (SHED) procurement framework, enabling national deployment pathways.

Finally, a structured post-Beta Phase commercialisation roadmap has been developed and will be updated throughout the life of the project to guide scaling to thousands of homes, covering certification, financing, installation capacity, flexibility-service integration, and cross-network replication.

6.9 Support for Non-Network Partners

The SHIELD project is providing extensive support to non-network partners to help them progress toward commercialisation of their solutions. This support spans technical development, commercial model refinement, regulatory alignment, investment readiness, procurement access, and capability-building across the wider consortium.

A key element of this support is the technical maturation enabled through SHIELD's pilot installations. The initial HeatHub pilot home has allowed Thermify to identify and resolve early-stage product issues and subsequently redesign the HeatHub. These improvements strengthen product reliability and accelerate Thermify's progress toward a production-ready system capable of large-scale deployment.

The project also supports non-network partners by developing and validating the ESCo commercial model that underpins the SHIELD solution. By demonstrating financial viability and establishing practical billing and operational processes, the project provides partners such as Power Circle Projects and Essex Community Energy with a clear and replicable commercial framework for service delivery at scale.

SHIELD has further developed a complete suite of legal and contractual materials which non-network partners can adopt for their own delivery models. Importantly, the shift from a lease-based installation structure to a licence-based approach substantially reduced lender approval requirements for landlords, thereby removing a significant barrier to commercial adoption and improving scalability for partner-led deployment.

Regulatory alignment is another major area of support. The project is engaging directly with DESNZ, BRE and the HEM development team to ensure the HeatHub is appropriately represented in future EPC assessments. This work reduces regulatory uncertainty for partners who depend on EPC compatibility to access social housing markets and unlock wider adoption. Through this engagement, the project is helping partners position their technologies for future compliance and market acceptance.

Non-network partners additionally benefit from market access support. Insights into aggregator capabilities and a phased grid-services engagement strategy provide a clear route for partners to participate in flexibility markets.

Operational capability is strengthened through SHIELD's provision of templates, technical specifications, onboarding materials, and tenant-communication tools.

Finally, the project is producing a post-Beta Phase commercialisation roadmap that sets out the steps required for non-network partners to scale to thousands of homes, including certification milestones, landlord recruitment pathways, financing structures, installation sequencing, and operational scaling considerations. This roadmap provides a structured plan for partners to continue their commercial journey beyond the SIF funding period.

Through these combined activities, SHIELD is actively enabling its non-network partners to transition from innovation participants to commercially viable providers of low carbon energy and heating solutions, equipped with the technical, commercial, regulatory, and operational foundations required for long-term success.

7. Policy, Regulatory and Standards Barriers

The SHIELD project has encountered regulatory, policy, and standards barriers that have required both technical workarounds and proactive engagement with regulators to deploy the innovation at scale beyond the trial environment.

The most prominent regulatory challenge has been the proposed dual metering solution as described in Section 2 (one meter for the household, one meter for the ESCo, for domestic properties) to enable the ESCo model and associated grid services. As mentioned in Section 2.3.3 Ofgem's guidance to the relevant supply licence conditions is that, while two boundary meters can be installed at a domestic property, both must be registered to a single customer. This guidance is problematic for SHIELD because the ESCo model depends on a second metering point being managed by the ESCo for associated grid services and lower-cost tariff access. Without an alternative solution, this prevented the ESCo from managing the second meter as a business customer, this complicates billing and credit arrangements, customer protection, and project financing. The project team has identified an alternative to the original dual metering solution: a twin-element sub-metering system within a single boundary meter, this is described more in Section 2.3.3.

Another regulatory challenge has been the certification and EPC recognition (SAP Appendix Q and HEM) as detailed in Section 2.4. The HeatHub requires certification under Appendix Q or the new HEM to ensure it is recognised in EPCs for homes. The current Appendix Q process doesn't fit the HeatHub technology into this certification, and HEM is still under development, with a consultation version being made available January 2026. Without certification, social landlords may be unable or unwilling to participate beyond project trials, as installations could negatively impact EPC ratings. There is agreement with the social landlords for the SHIELD project that a small number of Thermify units required for the trials can be rolled out in high EPC properties pre-certification, so that the properties do not fail below the minimum performance standard required for rented homes, to gather necessary data. The project team has worked closely with DESNZ, BRE, and the relevant HEM contractors (City Science, Scene) to ensure that the Thermify solution is appropriately represented in future energy performance assessments and SAP ratings. The transition from Appendix Q to the HEM as the standard for energy system assessment has required ongoing engagement and technical input to ensure that the SHIELD system is not disadvantaged in EPC calculations.

8. User Needs

The SHIELD project's prioritised users are low-income and fuel-poor households in social housing, alongside the social landlords who own and manage these properties.

For households the key needs are:

- access to affordable and predictable energy bills
- confidence that comfort and reliability will be maintained
- minimal disruption during survey and installation activity
- clear, accessible information about what is being installed, how billing works and what support is available.

For social landlords, the core needs are:

- solutions that are technically safe and reliable
- operationally deliverable across varied housing stock
- compatible with landlord governance requirements (including assurance, compliance and the ability to evidence value to tenants and stakeholders).

These needs are being translated into SHIELD's design and requirements through iterative engagement with social landlords and tenants, supported by specialist partners including Explain and Citizens Advice Essex. The project has prioritised plain-English communications and simplified documentation so that households can make informed choices. The service design is built around inclusive principles to ensure the contract documentation is accessible for vulnerable households with lower digital skills or additional support needs. This includes structured, one-to-one conversations where needed, and the use of independent support expertise to test that information and processes are understandable and appropriate

Social landlords, on the other hand, need solutions that improve the energy performance of their housing stock, helping them meet regulatory targets such as EPC ratings, and protect tenants from rising energy costs, all while avoiding complicated contractual obligations or financial risk.

The SHIELD user journey, as shown in Figure 6, begins with social landlord engagement and education of the SHIELD solution. Upon agreement to take part, landlords identify candidate properties from a strict set of criteria provided by the project. This is followed by tenant outreach and onboarding, where appropriate, tenants are offered additional support conversations to ensure informed consent, particularly for households with additional needs or where complexity could create barriers to participation. Once a household opts-in, the journey progresses through to property assessment to determine if the home is suitable, where upon contracts are provided to the tenant and explained. Upon sign-up the installation process commences, legacy heating systems are retained at the social landlords discretion until the new system is proven. The energy service commences once installation is complete enabling discounted electricity and low-cost heat. Ongoing support is provided through customer service channels, and tenants are invited to participate in feedback surveys and performance monitoring.

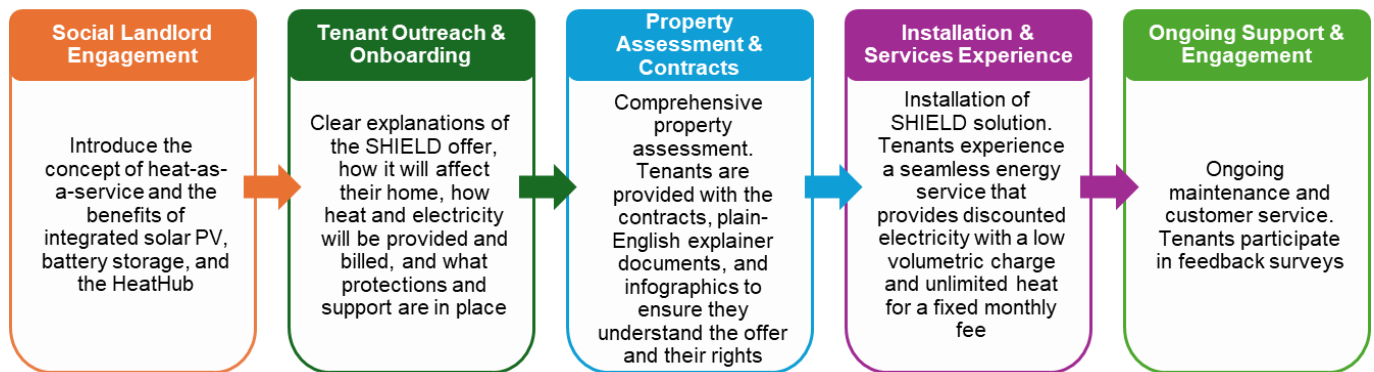


Figure 6: User Journey

The journey is designed to be as simple and transparent as possible, with clear communication at every stage.

The project's understanding of user needs has been deepened through feedback from pilot tenants and landlords, contract review panels, and technical performance monitoring. A number of adaptations are being made to improve the customer experience, these are as follows:

- Technical design updates are being made to minimise disruptions to the tenant, such as modular installations and IP65-compliant external enclosures
- Billing systems have been reviewed and adapted to ensure clarity and accuracy for the tenant
- Engagement materials have been tested with panels and tenants to ensure they are accessible and easy to understand
- Improvements in engagement strategies and installation planning have been undertaken following feedback from tenants during pilot installations, which highlighted the importance of clear pre-installation communication and realistic expectations about disruption.

Across the journey, the project is actively minimising burden on future users by standardising materials and processes (e.g., tenant-friendly information, simplified contracts, and repeatable onboarding steps) and by incorporating feedback from both landlords and tenants to remove friction points early, rather than pushing complexity onto households at sign-up or installation. The intention is that these refined processes will support replication beyond the initial trial settings and reduce duplication of effort for future roll-out activity.

9. Impacts and Benefits

The project's original Beta Phase application anticipated that the integration of the HeatHub, solar PV, battery storage and a EScO model would provide a step-change in affordability, predictability, and decarbonisation of home energy for these groups. The project has made progress toward these benefits, while also adapting to real-world challenges and generating additional impacts beyond initial expectations.

The SHIELD project is expected to deliver substantial net benefits to consumers, both in terms of financial savings through reduced energy costs, improvements in comfort and wellbeing and carbon savings.

In addition to consumer benefits, SHIELD also delivers clear network benefits that support the transition to Net Zero. By generating and consuming more energy locally through PV and batteries using an optimised household energy management system, the project reduces peak demand on the distribution network. This local reduction in grid import means that the scale and urgency of reinforcement required to enable decarbonisation is significantly reduced.

9.1 Progress Toward Beta Phase Application Benefits

From the outset, the Beta Phase application projected that participating households would achieve significant reductions in electricity costs to fuel-poor and vulnerable households, typically around 20%, and up to 40%, alongside a 90% or greater reduction in carbon emissions.

The pilot installations have demonstrated technical feasibility and early indications of cost savings to a typical household can expect will be around a 20% reduction in electricity costs. These figures are consistent with the Beta Phase application and have been validated through pilot data and tenant feedback. Early results also indicate a greater than 90% reduction in carbon emissions for participating homes, as projected.

The fixed monthly fee model for heat and hot water, combined with discounted electricity from solar PV and battery storage, is providing tenants with predictable, manageable bills and reducing the risk of underheating, a key driver of poor health and housing conditions that is typical in this demographic. Tenants have reported improved comfort and reduced anxiety about heating costs, highlighting the social value and vulnerability benefits that were central to SHIELD's justification.

Pilot installation and technical evaluation have demonstrated that the HeatHub can reliably deliver tenant-set temperatures. Data from the first three months of Switcher monitoring shows that delivered temperatures closely match tenant preferences, validating the technical performance of the system.

Progress has also been made toward realising the wider system and revenue benefits modelled at Beta Phase. The project has resolved key metering challenges by adopting a twin-element configuration that is compliant with current metering regulations, preserves access to grid-services revenues and maintains the integrity of the EScO business model.

Detailed assessments of flexibility markets, revenue-stacking opportunities and routes to market have strengthened the commercial foundations needed for longer-term deployment.

Significant advancements have been made in the commercial, regulatory and engagement workstreams, including the development of inclusive tenant communications, a refined EScO contract suite and ongoing collaboration with DESNZ and HEM contractors to secure future certification pathways for the HeatHub.

Although delays to external investment funding and social-landlord approvals have slowed installation activity, the underlying benefits case remains strong, and the pilot results confirm the savings, carbon reductions and consumer outcomes anticipated in the Beta Phase application. The project continues to build the technical, commercial and regulatory evidence required for scale-up, ensuring that the benefits forecast at application stage remain achievable as SHIELD moves toward wider rollout.

9.2 Changes to Proposed Impacts and Rationale

The project believes that the benefits set out are realistic, therefore there are no changes to the impacts outlined in the Beta Phase application.

9.3 Developments or Events Affecting Benefits

Several developments during the reporting period have the potential to affect the scale and timing of benefits achieved through SHIELD.

Delays in external investment funding for Thermify and Essex Community Energy have slowed HeatHub production and delayed social landlord sign up due to delays to the manufacture and certification of the HeatHubs, which in turn has delayed installation activities into later project stages. SHIELD will provide funding to manufacture the first batch of HeatHubs, ensuring continued progress but limiting the number of initial installations and the number of households benefitting from reduced bills and carbon savings.

Social landlord onboarding has also taken longer than anticipated due to lender approval processes and legal reviews, which has delayed tenant recruitment and the rollout of early installations.

Regulatory uncertainty around domestic metering arrangements required the project to pivot from a dual-meter approach to a twin-element configuration, delaying but ultimately preserving the ESCo model's ability to access flexibility revenues and deliver consumer savings.

Ongoing engagement with Ofgem and DESNZ is required in relation to energy metering solution options for roll out, specifically P379 as detailed in section 2.3.3, and HEM certification issues. Whilst the energy metering solution is not a barrier to roll out HEM certification could affect the speed and scale of benefits if not resolved.

While these events have influenced the pace of benefit realisation, the project has implemented mitigations, and none of the developments alter the underlying ability of SHIELD to deliver the benefits outlined in the Beta Phase application once installations commence at scale.

9.4 Estimate of Future Value to Customers

The project's data and insights are informing the development of new products and services, further enhancing the value proposition for tenants, landlords and network operators. For consumers, this means sustained reductions in energy bills, improved comfort, and protection from volatile energy prices. For the wider system, it offers significant carbon savings and network cost avoidance. The projected net benefits remain:

- Energy bill savings:
 - Estimated £4.2 million in trial and £7.2 billion in GB roll-out up to 2055
- Carbon savings:
 - Estimated 3,900 tCO₂e in trial and 1.3 million tCO₂e in GB roll-out up to 2055
- Network cost avoidance:
 - Estimated £367k in trial and £497 million in GB roll-out up to 2055
- Revenue generation:
 - Estimated £5.5 million in trial and £4.7 billion in GB roll-out up to 2055 from grid services and exports.

These figures underscore the long-term value of the SHIELD model and its capacity to deliver both economic and environmental benefits while addressing fuel poverty and supporting a just energy transition.

10. Risks, issues, and constraints

Identifying risks has proven to be a highly valuable exercise and has been made a key part of the weekly cadence with project team leads. This has developed team maturity on the method of identifying risks and mitigating actions that are tracked centrally in a risks, issues, assumptions, and dependencies (RAID) log.

The project has identified several constraints primarily relating to the regulatory landscape, social landlord complexities, and delays to external funding. The project team has implemented mitigating actions to address these challenges while maintaining progress toward project objectives.

Regulatory and Policy Constraints	
Energy Metering Solution	
Regulatory barriers to deployment of a dual meter solution: Ofgem's current guidance of supply licence conditions mandates that both meters at a domestic property must be registered to a single customer, which complicates the SHIELD ESCo model and restricts the ability to offer lower-cost energy tariffs and streamlined billing. This creates barriers to implementing the intended billing structure and risks delaying installations as explained in Section 7 Policy, Regulatory and Standards Barriers.	Mitigating Actions: Twin-Element metering solution proposed for the trials and investigation of P379 for scale up.
Trial Constraints	
Social Landlord Sign Up Delays	
Delays in social landlord contract sign-off: Lender approvals have delayed tenant recruitment and installation timelines, affecting the ability to meet project milestones and deliver benefits on schedule. Commercial contract complexity has also posed challenges, particularly in aligning the requirements and risk appetites of multiple social landlords, each with their own legal, financial, and operational frameworks. The project initially proposed lease agreements for equipment installation, but these proved problematic for landlords and their lenders.	Mitigating Actions In response, the team adapted by developing licence agreements, which are simpler and more acceptable to stakeholders. This change will streamline onboarding and reduce legal risk, but it required additional time and resources to implement. The project has worked closely with landlords and installers to develop clear selection criteria, survey processes, and upgrade protocols, ensuring that only suitable properties are included in the trial and that responsibilities for upgrades are clearly assigned.
Technology Constraints	
External Funding Delays	
Delay to Thermify HeatHub production: External investment funding delays for Thermify have impacted the rollout of HeatHubs, risking missed heating seasons and reduced data collection.	Mitigating Actions: SHIELD to revise project funding schedules to enable the build of the first batch of HeatHubs. A plan has been developed to understand the minimum number of units and mitigations should delays continue with Thermify external investment funding. Other external

	funding streams are being explored should these delays continue.
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Table 3: Top risks

11. Working in the open

The SHIELD project has embedded transparency and stakeholder engagement at every stage, using open communication, collaborative design, and proactive knowledge sharing to maximise impact and support sector-wide learning. This approach not only strengthens the project's outcomes but also lays the groundwork for successful replication and scale-up across the UK and beyond.

The project has adopted a multi-layered approach to communication, collaboration, and knowledge sharing, ensuring that all stakeholders (including tenants, social landlords, regulators, industry partners, and the wider public) are informed, involved, and able to contribute to the project's evolution.

Public communication about the project has been achieved through several channels:

- Open dissemination:
 - Lessons learned are presented at SIF Community Forums, industry conferences, and through direct engagement with other distribution network operators (DNOs) and sector partners
- Media engagement:
 - Project awareness through partner websites, specific sector publications and national press organisations, such as BBC News coverage in November 2025, which increased public awareness and generated direct interest from potential stakeholders and participants.

The project team has also presented at industry events, such as UK Power Networks' Net Zero Networks event, Utility Week Live and Innovate UK's scale-up team sessions and has contributed to sector-wide discussions on low carbon innovation, social housing, and regulatory reform.

Contract templates, onboarding materials, and technical reports have been reviewed by external panels, including Explain's customer panel, to ensure accessibility and relevance. Feedback from these panels has led to significant improvements in contract clarity, communication materials, and tenant engagement processes.

The project team has worked openly and built relationships with a wide range of organisations and teams responsible for other parts of the user journey.

- Social landlord engagement:
 - Developing legal frameworks, governance pathways and refining installation processes based on operational realities
- Regulatory and Policy Engagement:
 - Clarification sought and obtained from Ofgem on the proposed a dual metering solution
 - Ongoing dialogue with Ofgem inviting regulatory input especially around the energy metering solution, both to seek guidance and to advocate for pragmatic solutions to regulatory barriers
 - The project has also engaged with DESNZ, the HEM development team, and other regulatory and policy bodies, ensuring the project addresses real-world policy and standards challenges
- Engagement with Financial Partners:
 - Collaboration with Bankers for Net Zero and social impact funds supports the development of scalable financial models for retrofit and decarbonisation.

To avoid duplication of effort and accelerate industry progress, the project will make all key outputs available to other SIF projects, network licensees, and sector stakeholders. Lessons learned will be shared through the Smarter Networks Portal, industry events, and direct engagement with other innovation consortia.

- Consortium Approach:
 - The project brings together UK Power Networks, social landlords, local authorities, technology providers, and community organisations

- Regular meetings, workshops, and working groups ensure all partners contribute to and refine project direction

Several insights have been gained from stakeholder engagement that are relevant for future projects:

- Early and ongoing engagement with social landlords and tenants is essential for building trust, clarifying requirements, and managing risk
- Regulatory uncertainty, particularly around metering and supply arrangements, could be a major barrier to innovation and requires proactive engagement with regulators and policymakers
- The development of clear, accessible contracts and communication materials is critical for tenant engagement and onboarding, especially in vulnerable or low-income communities
- The integration of new technologies and business models into legacy social housing systems requires flexibility, patience, and a willingness to adapt processes and expectations as challenges arise.

12. Costs and value for money

The SHIELD Beta Phase has managed its funding with a strong focus on value for money, transparency, and consumer benefit, in line with the original forecasted budget and Ofgem SIF requirements. The project's financial management is designed to maximise the impact of SIF funding, leverage private and partner contributions, and ensure that any unspent or surplus funds are returned to consumers or reinvested in further innovation.

Project Partner name	SIF funding requested	Total actual project spend to date	Total project contribution made (incl. contributions in kind)
UK Power Networks			
Citizens Advice Essex			
Eastlight Community Homes			
Essex County Council			
Essex Community Energy			
SP Electricity North West			
Power Circle Projects			
Thermify			
UK Community Works			
UrbanChain			
Total			

Table 4: Project Partner Spend

12.1 Value for Money to Consumers

The SHIELD project delivers value for money to consumers by reducing energy costs for low-income households, improving comfort and wellbeing, and building a model that lowers long-term system costs for networks and landlords. The project is designed so that consumer benefit is realised immediately by participating households and indirectly across the wider energy system as the approach scales.

The project's integrated solution has already demonstrated measurable reductions in energy bills based on pilot data. The pilot installations show tenants achieving around 20% reductions in electricity bills. The combination of high solar PV self-consumption, battery optimisation and the fixed-cost heat-as-a-service model reduces exposure to volatile energy prices and improves affordability for households facing the highest vulnerability. These savings come with no upfront cost for tenants. The ESCo model covers capital and operational costs through a blend of energy sales, grid-services revenue and commercial arrangements, ensuring that financial benefits flow to residents rather than being absorbed by intermediaries.

The HeatHub pilot tenant reported an increased comfort and reduced heating-related anxiety, especially important for people on low incomes. The system reliably maintains tenant-set temperatures, which helps prevent under-heating, a major contributor to damp, mould and health risks in low-income households. This delivers real social value by reducing fuel stress and improving day-to-day living conditions.

The ESCo model enables the system to earn grid-services revenue through activities such as export optimisation and demand-side flexibility. Any revenue generated is returned directly to consumers via reduced energy bills, ensuring public value is maximised and that benefits are not captured by project partners. This

reinforces the project's core principle that low-income tenants should be the primary beneficiaries of innovation.

12.2 Unspent SIF Funding

SIF funding is being closely monitored throughout the project, if at the end of the Beta Phase there is any unspent SIF funding these will be returned in accordance with SIF governance. The project's financial reporting processes ensure that all expenditure is tracked and justified, and that any unspent funds are identified and managed appropriately.

12.3 Revenues Earned and Returned to Consumers

Surplus revenues generated from grid services, flexibility products, or surplus energy exports during the Beta Phase are returned to SHIELD customer through reduction in their energy bill. The ESCo model is designed to ensure that surplus revenues are used for the benefit of tenants, rather than being retained by project partners.

12.4 Significant Variations Between Planned and Actual Spend

- Delays in Social Landlord and Tenant Sign-Ups:
 - Contract and lender approval delays have pushed back installation timelines, resulting in lower-than-forecasted spend in some work packages (notably Beta Phase deployment and tenant engagement)
- Thermify Production and Funding Delays:
 - External investment funding delays for Thermify have required SHIELD to provide advanced upfront funding for the first batch of HeatHubs
- Legal and Commercial Model Changes:
 - The shift from lease to licence agreements has streamlined legal processes but required additional legal review and adaptation.

13. Special Conditions

Detailed below are all the conditions specified within the Project Direction, along with their status and supporting commentary where required. Progress against these conditions is monitored regularly, with status updates provided at every quarterly monitoring meeting to ensure transparency and accountability. The requirement for each condition is summarised below, followed by a description of its status.

	Project Condition Description	Status
1	The Funding Party must not spend any SIF Funding until contracts are signed with the Project Partners named in Table 1 for the purpose of completing the Project	Fulfilled: Contracts have been signed by all parties by the 26 February 2025.
2	Financial contribution: The Funding Party must report on the financial contributions made to the Project as set out in its Application. Any financial contributions made over and above that stated in its Application should also be reported and included within the Project costs template	In progress: Gross amounts will be reported quarterly by each partner and included in the project finance spreadsheet
3	Meeting arrangements: The Funding Party must participate in all meetings related to the Project that they are invited to by Ofgem, UKRI and DESNZ during the Beta Phase	In progress: All meetings attended to date

4	Stage gate scoping: The Funding Party must, with support from Innovate UK/UKRI and, where applicable Ofgem, scope the requirements and success criteria for each stage gate, as set out in the project management plan within a Project at the quarterly reporting meetings ahead of any stage gate. These will be used to determine what criteria a Project must meet in order to pass a stage gate, and whether any additional information, such as a report, must be produced as part of the stage gate.	In progress: Stage Gate 1 criteria agreed and Stage Gate 1 Evidence Review meeting held on 12 December 2025
5	Impact monitoring: As part of the end of Project Phase report, the Funding Party must produce a Project Impact Monitoring and Evaluation Plan. This plan must outline how the Project plans to monitor and evaluate the delivery of benefits outlined in the Beta Phase Application following the end of the Beta Phase. The plan must also include the methodology that will be utilised for quantifying and qualifying benefits realisation and how the Funding Party plans to report this to Ofgem 1, 3, 5 & 10 years post-Beta Phase completion. Further details on how to approach the development of this plan may be provided by Ofgem or IUK	Not started: To be completed as part of the End of Project Phase report
6	SIF Community Forums: The Funding Party and all Project Partners must make reasonable attempts to attend, participate and/or contribute at SIF Community Forum events occurring during the Project delivery. We anticipate there being approximately one event per year	In progress: Attended the SIF Community Forum 2025 in Edinburgh on 04 March 2025. Funding and Project Partners will attend the next SIF event on the 03 March 2026.
7	Policy, regulatory and standards barriers: The Funding Party must provide verbal updates at each quarterly meeting on any regulatory, policy and standards barriers and any change requirements which may impact delivery of the Beta Phase activities. The Funding Party must also include as an attachment to each of its annual progress report an update on any regulatory, policy and standards barriers which may require derogations and articulation of any proposed regulatory, policy and standards changes which would be necessary in deployment. The Funding Party must also provide an as an attachment to its end of Project Phase report a summary of the Project's findings on regulatory, policy and standards barriers, including any considerations for future work, and where applicable, where specific regulatory, policy and standards changes would be required for deployment.	In progress: Quarterly briefings have been included in each quarterly monitoring meeting and an attachment to this report is included. Future, obligations will continue to be met.

8	Updated 60-second videos: The Funding Party must provide within the first three months of signing contracts with its Project Partners an updated 60-second video. If the Project is greater than two years (longer than 24 months) in length, an updated video must also be provided at the Project's mid-point meeting. All Projects must also provide an updated 60-second video as part of their end of Project phase report. Innovate UK can share its guidance for 60-second videos with the Funding Party, if necessary.	In progress: First video supplied. Remaining obligations will also be met.
9	Post-Beta Phase roadmap: The Funding Party must provide to the monitoring officer within six months of it signing contracts its Project Partners a roadmap for activities post-Beta Phase. This can build on the Project's Application question (question 11) and must focus on how and when the proposed solution will become business as usual within your network and across the other GB gas or electricity networks. As part of this, the Funding Party must include consideration for: 1. any steps the Project will take to ensure its innovation has suitable business as usual adoption; 2. the Funding Party's strategy for adoption of the innovation or proposed solution, giving consideration to potential investment, ongoing costs and third-party involvement and; 3. any early indication of interest from other networks in adopting the innovation. The Funding Party must provide an update on all the above at every two quarterly monitoring meetings (i.e. every six months) and must include a final update of this roadmap as attachment to its end of Project Phase report	In progress: The roadmap has been shared and will continue to be updated.
10	Commercialisation strategy: The Funding Party must provide at every second quarterly monitoring meeting (i.e. every six months) an update on its commercialisation strategy. This can build on the Project's Application question (question 12) and must focus on what considerations have the Project consortium made for the commercialisation of the proposed solution or innovation, and how the Project provides support for non-network partners to move towards commercialisation. As part of this, the Funding Party may wish to include consideration for: a) who the primary customer segment is beyond the Funding Party; the customer value proposition;	In progress: An update has been shared in the six-monthly monitoring meetings. Furthermore, the workstream on Commercialisation and Route to Market has been brought forward into 2025 to support this condition. An interim-commercialisation strategy has been drafted and is available as an attachment to this annual report.

	b) if identified, the outline of the route to market and potential new partnerships; c) any additional Project Partner capital requirements in order to commercialise the innovation and; d) how this product, process or service could be scaled across the GB network and taken to new markets. The Funding Party must also include a final update of its strategy as an attachment to its end of Project Phase report. Ofgem and/or Innovate UK may issue a template for the final update as part of the end of Project Phase report.	
11	Data Best Practice and Digital Strategy and Action Plan Guidance alignment: The Funding Party must provide at its second monitoring meeting (i.e. quarter one) a summary of how it intends to comply with Ofgem's Data Best Practice Guidance, and Digitalisation Strategy and Action Plan Guidance. Additionally, a part of its year 1 annual progress report, the Funding Party must provide a written update to the monitoring officer on its incorporation and application of data best practices to date in the Project, including its presumed open data policies, and data triaging methodology.	In progress: The summary of how the project intends to comply with Ofgem's Data Best Practice Guidance, and Digitalisation Strategy and Action Plan Guidance has been made available at the 2nd quarterly review meeting (QRM 2) for review and has been shared with the Annual Report.
12	At the kick off meeting, the Project must provide explanation on how the tenant would receive the discount on electricity should they change supplier.	Fulfilled: As presented at the kick off meeting, tenants will receive two bills, one from the EScO Essex Community Energy (ECE) and one from their choice of supplier through the meter. Their discount comes from the total of the two bills being less than their single bill without the SHIELD system. The ECE bill is unaffected by their choice of supplier. Advice is given to tenants on time of use tariffs to make best use of their battery and the first Alpha pilot tenant has taken this advice and already reported additional savings, we are exploring retail partnering with several licensed suppliers to enable a one-bill approach.
13	Prior to the Funding Party beginning work on the Project, it must provide to the monitoring officer an update on the two pilot installations of the HeatHub showing the technical viability of the solution. Further updates must be provided during the quarterly meetings until the installations have been completed.	In progress: A Thermify HeatHub is installed in one home. Initial performance reviewed during meeting with UKRI on the 13 December 2024. The project continues to monitor the performance and is reported at all subsequent QRMs.

Table 5: Project Conditions Status

14. Material Changes

There are no material changes to report.

Appendix A Lessons Learnt Summary

Technical Insights

Table 6 captures the key learnings related to the development, design, and evolution of the SHIELD technical solution.

Theme	Learning
Thermify Design - leakage	The oil-based heat transfer circuit within the prototype HeatHub lacked sufficient containment to prevent spilled fluid from impacting the surrounding environment. The production design of the HeatHub has been updated so that oil is not used; instead, it uses water as the heat transfer fluid, significantly reducing the potential for environmental or property damage in the event of a leak. The HeatHub chassis and bund system have been redesigned to provide improved containment and to prevent external leakage in the event of a future fault.
Thermify Software Configuration – Heat Battery	A power outage had reset the heat battery software configuration to factory settings, the heat battery requires specific configuration with the HeatHub to function correctly therefore it was not able to operate as intended. The monitoring and control system that autonomously detects the outage and notifies the tenant immediately have been developed this enables remote and automatic reconfiguration of the heat battery to restore intended operation after a power cut. this will be rolled out in the production version.
Smart Thermostat – Non-Responsive	The pilot home tenant reported that attempts to adjust the heating via the smart thermostat (Switchee) produced no response. The issue was addressed through a system reset performed by the Switchee technical team. A standard operating procedure will be established that will be incorporated into Call Centre handbooks and training during the rollout phase to reset the Switchee thermostat immediately if similar failures are reported.

Table 6: Technical Insights

Project Delivery Learning

Table 7 highlights operational and collaborative lessons from the project's execution. It focuses on team dynamics, planning, resource management, and stakeholder engagement, offering insights to improve future delivery approaches.

Theme	Challenge	Learning
Regulatory	Complex regulatory requirements, i.e. energy metering solutions, and interpretation of rules impacting timelines requiring technical workarounds.	Close collaboration with key stakeholders and technical partners is essential. Proactive engagement and influencing consultation processes (e.g., HEM development) help mitigate regulatory hurdles and ensure solutions are appropriately represented.
Stakeholder Engagement	Legal, financial, and operational requirements from social landlords were more complex and variable than anticipated, causing delays in sign-up and integration challenges.	Early and continuous dialogue is critical. Ongoing engagement helps align expectations, manage risk, and address legacy system constraints when introducing new technologies and business models into established processes.

Flexibility and Iterative Adaptation	Rigid project plans were incompatible with multi-stakeholder, multi-technology innovation; required changes to legal and technical models mid-project.	Iterative adaptation is key. Flexibility in legal models (e.g., lease to licence) and technical solutions enables progress despite unforeseen challenges and delays.
Dependence on External Funders	Reliance on external funding caused severe delays in project activities and progress.	Identify funding-dependent activities early and review project funding to release internal resources where possible. Build mitigation strategies for investment delays to maintain momentum.

Table 7: Project Delivery Learnings