CarbonCo–op

WP4 D1: RetroMeter Engagement Summary (final report)

RetroMeter Alpha (SIF)

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Contents

Introduction

This interim report provides an update of progress to date in understanding the engagement approach on two different retrofit delivery models that represent potential pilots for the MES methodology developed under RetroMeter. These are:

1. A community intermediary led Area Based Scheme
2. A publicly procured large scale retrofit programme - in this case a Social Housing Decarbonisation Fund (SHDF) programme being delivered by Manchester City Council.

In the first half of the RetroMeter Alpha project we focused on the Area Based Scheme in particular. There have been substantial delays in the flow of information from Manchester City Council so this information represents our understanding of the current status of that scheme. Resourcing challenges within the council contributed to this, but also complexities and delays to the wider SHDF programme.

The first two sections look at the context, summarising:

- The data required for the MES methodology
- Messaging approaches.

The report then moves on to look at the two example schemes in more detail:

- Area Based Scheme led by Carbon Co-op as a community intermediary.
- Manchester City Council's SHDF programme, specifically the boiler replacement strand of this.

The implications of this engagement planning are discussed in WP4 Deliverable 3: Beta Phase Plan and Contractor Engagement.

Glossary

Area Based Scheme (ABS): Area based retrofit involves undertaking retrofit projects in large numbers in one local area. Definitions vary, but when we talk about an ABS approach, we refer to the bringing together of innovative forms of finance, contractor training and householder and community engagement for a closed-loop economic system for local domestic retrofit. By combining different tenures in similar properties, the process is more cost-effective because bulk procurement facilitates one process for design and delivery. This creates a model for neighbourhood energy action that places householders and collective action at the centre of the process.

BS 40101:2022 *Building performance evaluation of occupied and operational buildings (using data gathered from tests, measurements, observation and user experience). Specification.*
BS 40101 is concerned with the evaluation of the performance of buildings at any point during the operational stage of their lives. BS 40101 provides a tailored and graduated approach enabling the specification to be used across all building types and uses and for a wide range of project or study objectives. BS 40101 covers the planning of building performance evaluation studies, including timing for new buildings or those subject to major refurbishment or retrofit and content based on the purpose of the evaluation and the use and complexity of the buildings.

Community Intermediary: The role of a trusted intermediary is crucial to an ABS. Carbon Co-op acts as the client community intermediary within the ABS in Levenshulme. This role involves negotiating finance, detailing designs and construction works on the behalf of clients and upskilling the supply chain involved in the retrofits. It should be noted that the intermediary also plays a key contractual role in the project, entering into agreements with multiple householders on one side and a lead contractor on another. This results in a greater degree of control for the intermediary and the ability to manage work specification and quality, but also results in increased risks for the intermediary, for example in the instance of cost or time overruns.

Consumer Access Device (CAD): A Consumer Access Device (CAD) securely accesses real-time smart meter data and sends data to a cloud service.

Data Communications Company (DCC): Since being awarded the Smart Meter Communication Licence in 2013, the DCC has designed, built, and now manages the telecommunications technology infrastructure that underpins the smart meter roll-out. The DCC is responsible for smart meter enrolment (not installation, which is the responsibility of energy suppliers), developing, operating and maintaining the network in line with security standards.

Department for Energy Security and Net Zero (DESNZ): DESNZ is a ministerial department. It has responsibilities to deliver security of energy supply, ensure

properly functioning energy markets, encourage greater energy efficiency and seize opportunities in net zero to lead the world in new green industries.

Evaluators: Evaluators in this context are the people involved in evaluating retrofit schemes, gauging whether intended outcomes are met. On retrofit programmes delivered to compliance with PAS2035, this is a specific role and currently filled by a person qualified as a Retrofit Coordinator. The separately defined role of Retrofit Evaluator was retained in the 2023 updates to PAS2035 so that specialist qualifications can be added to later editions. Under PAS2035, where an Evaluator is undertaking monitoring and evaluation beyond the basic level, they should be skilled in planning building performance evaluation projects and identifying cross-correlations among performance parameters, and be knowledgeable in the probable root causes of performance anomalies. Guidance in BS 40101 on qualifications for Retrofit Evaluators should be followed.

Green Homes Finance Accelerator (GHFA): The Green Home Finance Accelerator (GHFA), is part of the UK Government's Net Zero Innovation Portfolio (NZIP) and is providing funding to support the design, development and piloting of a range of finance propositions which encourage domestic energy efficiency, low carbon heating, and micro-generation retrofit in the owner-occupied and private rented sectors.

Heat Transfer Coefficient (HTC): The Heat Transfer Coefficient is a widely recognised metric for describing building heat loss expressed as the rate at which heat is lost per degree Celsius air temperature difference between the inside and outside of a building in units of W/K. It includes the heat loss by conduction through the fabric and by infiltration and ventilation. A lower HTC demonstrates a lower rate of heat loss and therefore better thermal performance (BEIS, 2022).

Hildebrand: a company that acts as a smart meter data provider.

In Home Display (IHD): An in-home display (IHD) is a small digital device with a screen that connects wirelessly to gas and electricity smart meters. Householders can use it to see how much energy they are using and how much it costs. IHDs are provided by a householder's energy supplier. The code on the IHD is one way of smart meter data providers verifying that a smart meter matches the address.

One Stop Shop (OSS): A One Stop Shop provides homeowners with all the information and services they need to implement an ambitious retrofit project. There are different models of OSS, with the main difference between these being the responsibility the OSS bears for the result of the renovation works and for the overall customer journey. These are usefully explained in an Energy Cities publication from 2020 which can be found in the references section.

OpenEEmeter: OpenEEmeter is an open source toolkit for implementing and developing standard methods for calculating normalised metered energy consumption (NMEC) and avoided energy use. It is hosted by LF Energy.

N3rgy: a company that acts as a smart meter data provider.

Pay-for-performance: In a pay-for-performance scheme, the finance provided is linked to the performance outcomes of a project. In the context of Metered Energy Savings, this means that payments would be linked to the actual metered (and weather normalised) energy savings.

PAS2035: 2023: PAS2035 is a retrofit process standard. It is hosted by BSI. The full title is 'Retrofitting dwellings for improved energy efficiency - Specification and guidance.'

Social Housing Decarbonisation Fund (SHDF): A funding programme administered by the Department for Energy Security and Net Zero (DESNZ) to improve the energy performance of social homes in England.

Data required for the MES methodology

This section covers the overarching data requirements for the MES methodologies being explored in WP2. The engagement planning that follows is in response to these.

Methodology	Data/information needed for current approaches	Pre-retrofit	Post-retrofit
OpenEEMeter daily – as tested in UK	**Retrofit dates** - start and end date	✔	
	Household location (derived from postcode) so we can get weather data	✔	
	External temperature at location (extracted from weather data sources using location)	✔ One year	✔ Matched to available meter data
	Smart meter data - gas	✔ One year	✔ Winter season (minimum). Ideally one year.
	Sub-metered electric heating (e.g. heat pump) data (if household moved from gas to electric heating (e.g. heat pump) as part of retrofit)		✔ Matched to available meter data
Comparison methodology based on archetypes *	**Category/attributes of home** - e.g. building age, size and normal occupancy (to compare against other homes of same attributes/category)	✔	
Physics based	**Internal temperature data** (discussion on number of data points within house)		✔ Matched to available meter data.
	Smart meter data - gas	✔ One year	Winter season (minimum). Ideally one year.
	Smart meter data - electricity	✔ One year	✔ Winter season (minimum). Ideally one year.

* Note that for comparison methodology with matching based on consumption profile (which is more accurate than comparison methodology with matching based on archetypes), no additional data from the candidate household is needed.

Non-routine events

In addition to the core data points required for the calculation, demonstrating the methodology via a pilot, and then scaling the MES approach will need to consider how 'non-routine events' are captured, and the role these do or do not play in reporting of savings calculations. In view of the broader MES approach underpinned by financial mechanisms, this would also affect the auditability of modelling and calculations.

Non-routine events are generally large events that have a bearing on a customer's energy use. In a domestic setting this could include a significant life event that leads to occupants spending significantly more or less time at home, or major changes to the home that affect energy consumption. In the case of the RetroMeter work, gas consumption is of particular relevance (for example installing or removing a gas cooker, changing the water heating system, installing or removing other sources of heat such as solid fuel stoves etc).

The need to consider this is summarised by Recurve in the US:

> *"OpenEE is focused on portfolio-level savings, and prefers to use the law of large numbers to wash out non-routine events...*
>
> *Like many things however, the real solution is more nuanced. In reality, we often don't have huge portfolios, which means that one customer who installs an olympic pool behind his or her house can really skew the savings....*
>
> *In cases like these, non-routine adjustments may be needed to account for the uncertainty of major events on small portfolios in order to manage customer expectations and reduce adverse cash-flow impacts on aggregators in pay-for-performance programs. The goal of managing adjustments is to find a sweet spot that minimizes transaction costs while bounding risk so that aggregators, insurers, and investors have the confidence to participate.*
>
> *In sum, whenever possible we should rely on the law of large numbers, rather than complex non-routine adjustments, as a lower cost and ultimately more reliable measure of savings. When circumstances require non-routine adjustments, we should scale the approach carefully based on clear upfront criteria to align with both business models and customer expectations."*

(source: Recurve, https://www.recurve.com/blog/m-v-adjustments-create-a-bias-towards-savings-inflation)

The three approaches can be summarised as:

1. Use large enough portfolios calculations to 'drown out the noise' (preferred option)
2. Otherwise, make adjustments in the methodology to account for these (this can be complex[1]).
3. Alternatively, at its most basic, establish whether a householder has experienced a non-routine event so that they can be removed from any portfolio calculations and reporting.

On US programmes, Recurve currently takes option 3. However, we are aware that updates to OpenEEmeter may see this change over time.

> *"If a customer adds a major new load [or closes business or moves] this may be considered a non-routine event (NRE), in which the project would be removed from the aggregator portfolio and assigned savings based on the average performance of the aggregators portfolio. We request that aggregators confirm with the customer that they are not planning on adding or removing any major loads [or moving] during the measurement period."*
>
> Source: Recurve, DemandFlexMarket FAQs for aggregators[2]

While the methodological approach to this, and its integration with business models, will require further investigation beyond this Alpha stage project, we have considered when and how these non-routine events are captured might run as engagement touchpoints with householders. These are referenced in the engagement stages outlined in the next sections.

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[1] How Recurve approach this in commercial settings is summarised here: https://www.recurve.com/blog/how-to-calculate-reliable-savings-for-commercial-building-efficiency with an example Non-Routine Adjustment template here: https://docs.google.com/document/d/1CGvN8HilYDg4m90-nYxRsmJRWugQ8XILyaLSpjSvhqQ/edit#heading=h.gjdgxs

[2] DemandFlexMarket FAQs for aggregators: https://www.demandflexmarket.com/faq.html

Messaging

The Alpha phase project has generated some key considerations around messaging. Of particular note, the methodology work package findings (particularly around the comparative and physics-based models) again strengthens a portfolio approach to MES, and so is geared towards the financier perspective. Whilst this fills an important gap, it doesn't necessarily fill the gap for more accurate savings metrics at an individual household level.

In terms of messaging to householders, this creates challenges. There are fewer direct benefits to the householder in return for their data, especially while financial mechanisms are absent from the market. This makes messaging materials difficult to test properly until finance mechanisms are operational - we would be asking for comments on theoretical scenarios in the meantime.

We are likely to be reliant on householder goodwill and willingness to engage in research in the short-medium term - a factor we need to incorporate into planning for any MES pilot programmes. This is a relatively good fit on current Area Based Schemes as they are relatively immature and so a degree of self selection of householders occurs. This is more challenging on larger social housing schemes where data access is generally more difficult. Financial incentives (beyond potential bill savings) are also minimal on schemes where finance is provided by the landlord/housing provider.

We identified three main approaches that could be taken in householder messaging on MES:

1. Incorporates MES into a broader message about evaluating a retrofit project - i.e. it is one of several metrics used to understand outcomes.

2. Specific messaging around MES.

3. A Householder 'blind' method that doesn't mention MES at all.

The following table sets out the opportunities and challenges associated with each of these:

Approach:	**Opportunities:**	**Challenges:**
1. Incorporates MES into a broader	This is the reality of the majority of retrofit evaluation practice in the	In most publicly procured retrofits in the UK at present, minimal data

Approach:	Opportunities:	Challenges:
message about evaluating a retrofit project - i.e. it is one of several metrics used to understand outcomes.	UK, in that it needs to respond to multiple 'intended outcomes.' This makes it an 'attractive sell' in adding to the suite of methods that Evaluators and Retrofit Providers can use.	collection is done. What is done usually relates to basic occupancy surveys or environmental monitoring in a sample of homes. In a private context, monitoring and evaluation packages are rarely implemented due to a lack of budget for services that are considered 'extras' to capital works.
2. Specific messaging around MES	There is a large group of engaged householders within the early adopter community that still require retrofit works. These householders tend to be receptive to involvement in research projects, and willing to accommodate the data requests that a MES pilot may involve. Selling MES as a way to more accurately quantify the energy savings achieved by retrofit speaks to householders and key stakeholders. The limitations of existing methods (deemed savings) is widely acknowledged, so there is value in articulating the difference. Other advantages of the method (less intrusive, less costly) could be attractive to communicate.	The strength of the methodology lies in portfolio calculations, so the ability for a householder to 'get back' a savings figure for their particular home is more limited. However, with suitable caveats this could still be tested.
3. A Householder 'blind' method that doesn't mention MES at all	This may be something that can be achieved with a standardised, widely adopted and scaled MES approach - where the use of	We consider this challenging initially, because data collection and evaluation practices are relatively immature. The use of smart meter

Approach:	Opportunities:	Challenges:
	data for these kinds of calculations is widespread.	data and internal temperature sensors in particular is not commonplace - householder trust and active 'opt-ins' need to be secured, and we believe this requires a degree of messaging.

The next table summarises how we have approached these three strategies during the Alpha project:

Approach:	During Alpha we have:	Example messaging:
1. Incorporates MES into a broader message about evaluating a retrofit project - i.e. it is one of several metrics used to understand outcomes.	Reviewed and revised Carbon Co-op's ABS materials around approach 1. Example documents: - Flyer and letter - Information pack (an example of flyer text is shown in the appendix).	*"Households wanting to take part must be able to remain in contact with the Retrofit Team at Carbon Co-op throughout the project, by your preferred method of communication. This includes arranged contact after the works are completed, to talk about your experience and help us understand if and how your energy use, comfort and home environment changes due to the works."*
2. Specific messaging around MES	Drafted and distributed materials to test approach 2 via the MCC SHDF programme. Example document: - Booklet (the booklet drafted during Alpha is shown in the appendix).	*"...a lot of the time, we don't know if these benefits appear. We're trying to find ways to more accurately measure the benefits of home improvements...* *Most of the time when we add things like loft or wall insulation, or change the heating system, we make a 'best guess' about how much energy or money it will save. But it's not very accurate for lots of reasons.* *We can compare bills before and after, but even then, the weather from one year to the next can be very different.*

Approach:	During Alpha we have:	Example messaging:
		And sometimes we keep our homes a bit warmer afterwards (because they leak less heat), and that's not a bad thing. *But all these things make it hard for all of us to decide whether it's worth doing, and it can make it tricky for the energy network if we use more energy than we thought as they need to boost the wires and substations - that costs all of us in the long run."*
3. A Householder 'blind' method that doesn't mention MES at all.	Explored avenues that would include approach 3 via Switchee installations on the MCC SHDF programme.	-

For any follow-on MES programmes, it is worth also considering how the selected messaging approach might respond to what is considered 'best practice' in evaluation ethics with householders. This could be seen as an important aspect of building trust and confidence in the methodology and its deployment.

General Data Protection Regulations (GDPR) considerations:
From Wood Knowledge Wales Building Performance Evaluation guidance[3]:

The following principles recommended by Fionn Stevenson in Housing Fit for Purpose, 2019 are a useful framework for the BPE team:

- *No purposeful harm*
- *Honestly and integrity*
- *No coercion*
- *Informed consent, including a right to withdraw*
- *A requirement to confidentiality*
- *Equality and diversity*
- *Data protection. This should at a very minimum meet requirements set out by General Data Protection Regulations (GDPR) including that only the necessary data should be collected and stored, with a specified and explicit purpose, and treated fairly, lawfully and transparently.*

[3] https://woodknowledge.wales/wp-content/uploads/BPE_guidance_final.pdf

Case study: US approach

At the first point of householder contact (usually supplier websites) US rebates and incentive programmes rarely or never talk about how energy data is used. Smart meter requirements are not referenced because the data availability context is very different (penetration of smart meters is high and forecast to reach 93% by 2027[4]). This is in part driven by the policy mandate for metered data in the distribution of financial incentives.

Smart meter data aside, none of the programmes we looked at talk about how schemes are 'measured,' beyond broad statements about improving comfort and lowering bills. None found so far mention evaluation.

The way programmes are structured is also different from the majority of retrofit delivery in the UK. The main incentive around metered energy savings is for the contractor and aggregator, though there is a requirement for 100% of the upfront incentive (50% of the total predicted saving) to be passed to the customer, and therefore there is a financial incentive for householders to provide access to data.

Figure 1.1. Homeowner Journey

Source: 3C-REN Program Manual

3C-REN Home Energy Savings programme

The 3C-REN Home Energy Savings programme is a householder-led initiative, with the onus on the householder to assess and access various incentives and rebates. This is quite different in approach from a community intermediary led ABS or publicly procured retrofit, which is effectively project managed for the householder. Nevertheless, we considered this important in how benefits are framed for the householder. Observations include:

- Speaks directly to households (e.g. you, your)
- Focus on direct benefits to the householder (e.g. comfort, bill savings)

[4] https://www.smart-energy.com/regional-news/north-america/128-million-smart-meters-in-us-in-2023/#:~:text=Berg%20Insight's%202022%20North%20America,and%20149%20million%20smart%20meters.

- Wider reasons to participate are mentioned (e.g. community/global motivators)
- Generating confidence in the mechanisms that underpin the programme (e.g. robust, the best it can be)

"Make your home more comfortable, lower your energy bills, and switch to efficient all-electric appliances."

"When it comes to home projects that save electricity and natural gas, we're here to help! 3C-REN offers robust incentives for projects that are completed using an enrolled contractor. The first step is to complete the interest form below so an enrolled contractor can contact you. You'll also find our contractor directory if you wish to do additional follow-up."

"To help you achieve even deeper savings, we provide an Incentive Finder to identify additional local, state, and federal incentives and rebates. And if you need a helping hand along the way, we invite you to contact our Home Energy Savings concierge."

Incentive finder function:
"Explore incentives and rebates tailored just for you. Results are based on your home address and utility providers and include robust 3C-REN incentives as well as other regional, state and federal incentives and rebates that can often be stacked to increase your savings."

"Make your home the best it can be"
"Make your home safer for you and the planet"
"Set your goals! Set your sustainability goals, track your progress, and compare to neighbouring communities."

PG&E Comfortable Home Rebates programme[5] (now closed)
The closest references to data requirements are made in relation to programme eligibility. Here, householders are advised that they must have lived in the home for at least 12 months on application, and plan to stay in the home for at least the next two years.

The next section explores the implications of integrating Metered Energy Savings in householder engagement activities across two different retrofit programmes.

[5] PG&E Comfortable Home Rebates programme: https://comfortablehomerebates.com/home-energy-rebates/

Example 1: Area Based Scheme (community intermediary) model

Project overview

Carbon Co-op's Area Based Scheme was identified as a potential pilot for MES during the Discovery phase. Working with 7 households[6] across three streets in a network of terraces, this pilot project seeks to bring together innovative forms of finance, bulk procurement, contractor training, and householder and community engagement to pilot a closed-loop economic system for local domestic retrofit through a community client intermediary. The approach taken can be characterised as:

- enabling progress towards a whole house retrofit plan (and not piecemeal or single measures)
- the centering of residents in design and delivery
- area and neighbourhood based approaches
- bringing together innovative forms of finance
- a high degree of control around design, specification and installation
- a focus on high quality works.

While the Beta phase plan gives a more detailed description of the ABS model from a Retrofit Provider and business perspective, within this report we focus on the householder engagement aspects. The following section provides:

- A high level project map by stages, highlighting key MES integrations
- More detailed descriptions of each stage showing:
    - the current approach, and
    - suggested amendments to future ABS projects to integrate MES.

[6] As of March 2024 this was 6 due to a dropout.

ABS High level project map focused on engagement points

We completed a more detailed service map of Carbon Co-op's current phase delivery in Levenshulme as a precedent. This was helpful in understanding in more detail the different points at which householder interaction (and actions) are required, what this means for the delivery team - in terms of direct engagement with households, and what needs to happen behind the scenes to facilitate that, and what supporting processes these are contingent on. An example here would be software systems, Customer Relationship Management software (CRM), smart meter services etc.

The table below highlights areas where we have identified integration will be required to factor in a metered energy savings pilot.

	Pre sign-up engagement >	Recruitment >	Assessment >	Design and specification >	Arranging finance >	Installation >	Handover >	Evaluation
Activities	Early promotional activity	Information pack Expression of interest Householder survey	Householder survey - linked to retrofit assessment Discussion of retrofit assessment report	Householder engagement mostly relates to choices available (e.g. render and window colour) and facilitating survey access. Coordination needed around measures specification to ensure heat pump sub-metering data can be accessed.	Finance agreement*	Smart meter service onboarding * Data sharing agreement * Monitoring kit installation (temperature and relative humidity).	Sign-off declaration. Handover pack/home user guide.	Participate in post-works survey (1 year post works). Evaluation outcomes fed back to funders and householders.
Rationale	Expectation setting about pilot nature	Early data collection about smart	Value of metered energy savings	-	This may be applicable if a specific	These are crucial parts of a	Date of sign-off required for	Completion of MES calculations and integration of metrics in reporting to key stakeholders.

	Pre sign-up engagement >	Recruitment >	Assessment >	Design and specification >	Arranging finance >	Installation >	Handover >	Evaluation
	and some requirements to participate in research. Clarification on eligibility linked to smart meter data.	meter availability. Early engagement to troubleshoot metering issues.	in understanding outcomes.		funding stream was unlocked that required metered energy savings.	MES integrated project.	the intervention window (which must be discounted from calculation). Handover materials act as primer for post-works evaluation activities.	Length of connection required to enable reasonable MES calculations and models. Re-consent process for smart meter data (at present annual). Troubleshooting data quality issues. Capture non-routine events though evaluation activity.
Added value		FAQ/toolkit for supporting households through process.	Smart meter data could be used to supplement modelling: modelled vs actual consumption baseline. Data sharing process between the householder, smart meter service and assessment organisation would be					Householder engagement/value from access to data.

	Pre sign-up engagement >	Recruitment >	Assessment >	Design and specification >	Arranging finance >	Installation >	Handover >	Evaluation
			required.					
		* Opportunity window for smart meter service onboarding and data sharing agreement. Latest is at commencement of works as the previous 13 months of smart meter data can be accessed, allowing full pre and post-works calculation. Ideally this would be done earlier (e.g. at sign-up) as there are benefits for the householder in engaging with usage data, and this allows time for the team to support in troubleshooting smart meter infrastructure or data issues. The same applies for monitoring kit (temperature and humidity sensors) - the earlier these are in place, the better.					

Detailed stage descriptions

Early stage area engagement

Early stage community mapping was conducted by Carbon Co-op, benefitting from the team's local knowledge of active community groups and settings, and engagement techniques. Initial engagement consisted of posting **flyers and letters** to a network of streets that had been identified through the archetype research. Stakeholders were used as channels for these (Manchester City Council and Levenshulme Inspire - a key community organisation), in addition to directly posting in letterboxes. This initial interest was followed up with **drop-in sessions** (4 dates were provided at local community venues).

A brief **information pack** was compiled which included:

- A brief introduction to the scheme
- Which organisations were involved
- What is home retrofit?
- What are the benefits of home retrofit?
- What measures are available through this scheme?
- How is the scheme funded?
- What are the eligibility criteria?
- What is required from residents throughout the project?
- How you can express an interest in involvement.
- Indicative resident journey and estimated timeline.

Key points for a potential Beta pilot with metered energy savings:
There are clear opportunities to incorporate early messaging around metered energy savings, data requirements and funding. During any pilot phases this will ensure MES is integrated into the scheme offer, and not viewed as a bolt-on.

The following table outlines the existing materials identified as relevant (in yellow), and suggestions for new materials (in green).

Key engagement materials identified, alterations suggested for MES programme and rationale:

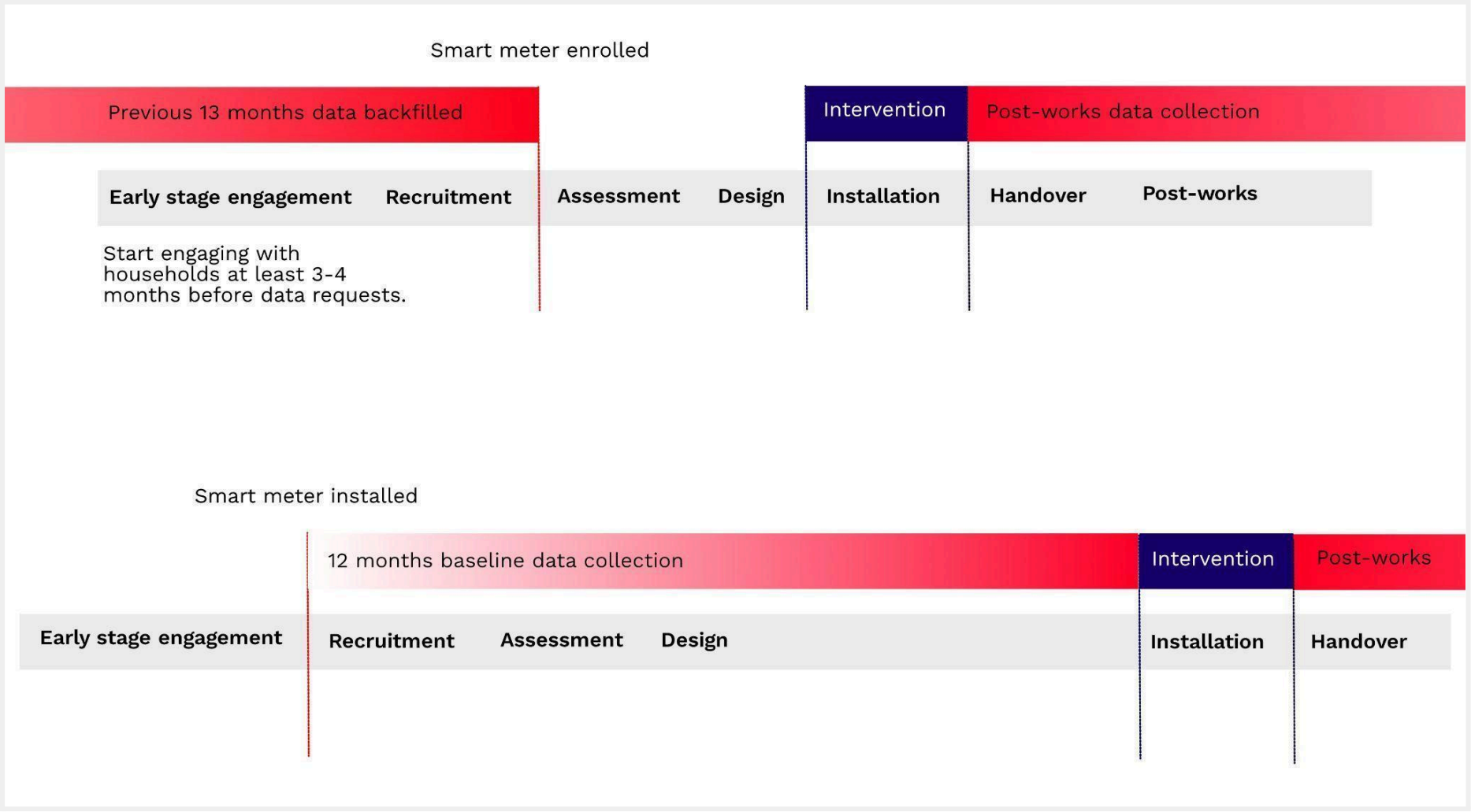
What is it?	Suggested amendments and rationale
Pre launch engagement in an area - e.g. street based engagements, community hub based training sessions	Feedback with householder liaison roles highlighted concerns about excluding people from future phases of an ABS based on their smart meter status. Whilst this may be less of a concern in a scaled MES scenario of 'business as usual', the reality is that only 50% of homes currently have smart meters and so needs to be considered for pilots. A suggestion was made that early (pre launch engagement work) in an area could be targeted around smart meters, raising awareness of the benefits they offer, peer engagement and countering myths around In Home Displays. This could play a role in building trust, as well as supporting households to get smart meters installed so they can participate in any subsequent MES programmes. ABS colleagues feel that even with a quicker finance aspect to an ABS programme, taking householders through assessments, design work and approvals still takes a long time, and there will be limits to shortening this window even with a scaled programme. This could allow for smart meters to be installed in enough time to collect the pre-works data required.
Introductory flyer - e.g. A5, for distribution via various methods	Suggested text: *The <neighbourhood> home improvement scheme is offering a number of homes in the <XXX> area grants and loans for home improvement works focused on making homes easier to heat in winter, and stay cooler in summer. This could include better insulation, windows, doors and ventilation.* *You'll be guided through the scheme by Carbon Co-op, a non-profit making community organisation. It is supported by <community anchor org> and <anchor institution>.* *We're trying to find ways to more accurately measure the benefits of these kinds of home improvements. If you take part you'll be contributing to this important research. For this reason we're looking for homes with:* - *working smart meters* - *a willingness to host monitoring sensors and complete some questionnaires.*

	(reverse side could include image and testimonial from a householder that has participated in a previous ABS scheme).
Letter (Carbon Co-op ref PM05)	Suggested addition: **"Who can take part?** We're trying to find ways to more accurately measure the benefits of these kinds of home improvements. If you take part you'll be contributing to this important research. For this reason we're looking for homes with: - working smart meters - a willingness to host monitoring sensors and complete some questionnaires." We will also prioritise: - <add criteria related to other objectives of scheme and funding requirements>
Information pack - provided electronically (e.g. PDF) or can be printed.	**Introduction** add: "This scheme will also be part of a project looking to more accurately measure the benefits of these kinds of home improvements." **What are the benefits of these home improvements?** Add: "Whilst we don't intend to include replacement heating systems (like a heat pump), by reducing the amount of energy your home needs to make it comfortable, these 'fabric' works will get you ready for the switch away from gas heating. So when the time comes, you can get a smaller (and less costly) heating system." What home retrofit measures are available through this scheme? Add: "Some monitoring equipment such as temperature sensors." **How is this scheme funded?** Add: "Some of the funding is coming from <MES pilot programme>, as part of a project called <project name, if applicable>. The partners on this project include <as required.>" **Who is eligible?** Add: "Smart meter - We're trying to find ways to more accurately measure the benefits of these kinds of home improvements. If you take part you'll be contributing to this important research. For this reason we're looking for homes with: - working smart meters (that would be in place for at least 12 months before any works start) - a willingness to host monitoring sensors and complete some questionnaires. - A willingness to share data from your heat pump (*only included if heat pump falls within scope*).

	Talk to us if you don't currently have a smart meter but would like to know more." **What would be required of residents throughout this project?** Add: "Households wanting to take part in this scheme must be able to remain in contact with the Retrofit Team at Carbon Co-op throughout the project, by your preferred method of communication. This includes arranged contact after the works are completed, to talk about your experience *and help us understand if and how your energy use changes.*" Add: **Sharing your data and taking part in research** Have you ever wondered whether things like insulation actually reduce energy use and your bills? We're trying to find ways to more accurately measure the benefits of these kinds of home improvements. **Why should we care about actual energy use?** We hear you, not everyone finds energy interesting. But we all pay energy bills - and part of our bill goes towards the cost of running the energy network (getting the energy through the wires and into our homes). Most of the time when we add things like loft or wall insulation, or change the heating system, we make a 'best guess' about how much energy or money it will save. But it's not very accurate for lots of reasons. We can compare bills before and after, but even then, the weather from one year to the next can be very different. And sometimes we keep our homes a bit warmer afterwards (because they leak heat less), and that's not a bad thing. But all these things make it hard for all of us to decide whether it's worth doing, and it can make it tricky for the energy network if we use more energy than we thought as they need to boost the wires and substations - that costs all of us in the long run. Part of the funding for this scheme is coming from a project exploring how we can make home improvements better by looking at what energy we're actually using (instead of best guesses). This information can help organisations like Carbon Co-op to plan works that will give you the most benefit in energy reduction and bill savings. It might also help to unlock more money to get the work done because it's seen as less risky. So, if you decide to take part you'll need to be willing to give permission for the following data to be

	collected and analysed: • Your smart meter data • Temperature and humidity data collected via small sensors and monitoring kit - at least after works are completed and potentially before. Your responses to questionnaires about your energy use at home and the impact of the work. This process is managed by <Carbon Co-op/other> and we are happy to share any findings with you. We understand that this data is personal and we will clearly set out how it will be used, stored and shared if you decide to sign up. Any reporting of data to funders will be anonymised.
Drop-in session slide deck	Drop-in sessions are held to allow householders to meet the Retrofit Provider and ask questions. As part of this session one or two slides could be developed to explain the requirement for smart meter data. A representative of a MES programme could also attend to answer specific questions.

The two figures below show the difference between engaging householders with existing smart meters (installed at least 12 months prior), and the shift in programme timeline if smart meters need installing.



Recruitment and assessment stage

Interested households were invited to complete an Expression of Interest Form. Selected householders were then invited to complete a more detailed survey.

As households progress to receiving a whole house assessment, the data collected becomes more detailed. For example, at this stage householders provide information on occupancy, heating behaviours (such as preferred target temperature and patterns of use). This is useful contextual information for wider evaluation activities - and whilst not directly required for the MES calculation, it could be used to 'triangulate' data and start to investigate further should the MES savings be lower than expected. Any sharing of such personal and detailed contextual data beyond the Retrofit Provider would need strong justification.

Key points for a potential Beta pilot with metered energy savings:

We consider all of these early engagement points to be a key time for introducing a Beta pilot as it will enable us to gauge data availability and appetite to participate in research.

The current phase of homes in Levenshulme have been onboarded to smart meter services before commencement of works - this has been necessary due to the stage of system development. However, in a MES pilot we would like to encourage the smart meter onboarding earlier in the process. This is why we have included references to smart meters in early stage engagement materials. There are several benefits to this:

- Householders are engaged with their energy data earlier in the process, potentially improving their understanding and confidence in the retrofit assessment and its outputs.
- Earlier onboarding allows issues with data access or completeness to be investigated and addressed well in advance of work starting. In some cases data issues may be due to physical smart meter infrastructure (such as a smart meter not working in smart mode), which the team could support the householders in resolving.
- Early connection to a smart meter service allows an annual consumption figure to be input to the retrofit assessment software, streamlining the process for the assessor/surveyor and avoiding the need for the householder to provide bill data. This also avoids the retrofit assessment outputs being purely based on estimated/modelled data.

Internal sensors have also been installed with current phase homes to test this process of collecting the supplementary data points required for the physics-based (MES+Heat Transfer Coefficient - HTC) methodology. For MES this is internal temperature, but other parameters are also being collected to support wider project and funding objectives. It is worth noting that on the current ABS scheme this represents very high quality, consistent data for calibration - on a

MES pilot/demonstrator more basic temperature loggers are likely to be deployed, to test that next step between innovation/testing and a scaled MES approach.

Feedback from engagement/householder liaison roles highlights that some care is needed around this stage. Asking for a lot of detailed data collection at the start can switch people off, so the focus should be on the minimum requirements linked to any eligibility criteria (in this case knowing if there are working smart meters, or if a householder is thinking of moving house within a couple of years). Moving into the assessment stage, there is naturally more data collection required. However, by this stage householders are more formally committed to the scheme and therefore willing to provide more information.

Moving towards MES as a scaled, business as usual operation, clear eligibility requirements could be integrated with recruitment stage materials. For example, similar to Recurve's wording:

> *"Project Site must pass the Pre-Enrollment Data Sufficiency and Eligibility Check:*
> - *Project Site must have a valid address according to...*
> - *Project Site must have energy consumption data that represents 12 or more months of energy usage.*
> - *Project Site must have a baseline model fit of less than 1.0 CVRMSE for eligibility.*
>
> *If the Project Site has an on-site solar system, installation of the system must have been completed at least 12 months before the project installation or have available net metering data."*
>
> Source: Recurve Measured Savings Program Implementation Guide. Eligibility (section 3)[7]

Some of this could be achieved via householder facing messaging, which leads to a degree of self-selection/filtering before applications are made. For more technical eligibility criteria (such as data quality and baseline model fit) this would need to be calculated using a suitable MES approved tool. Passing or failing such a check would then require further communication with a household by the Retrofit Provider.

[7] https://flexcoalition.org/wp-content/uploads/Measured-Savings-Program-Implementation-Guide.pdf

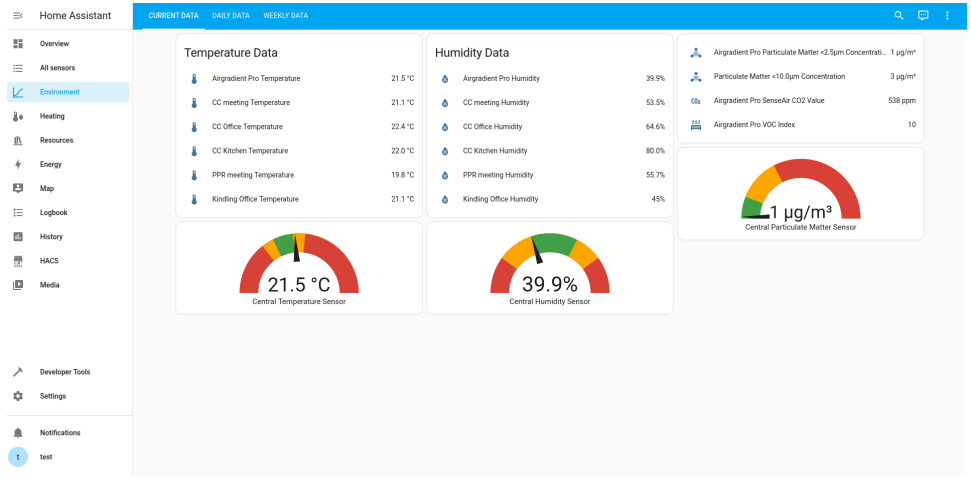
Key engagement materials identified for recruitment and assessment, alterations suggested for MES programme and rationale:

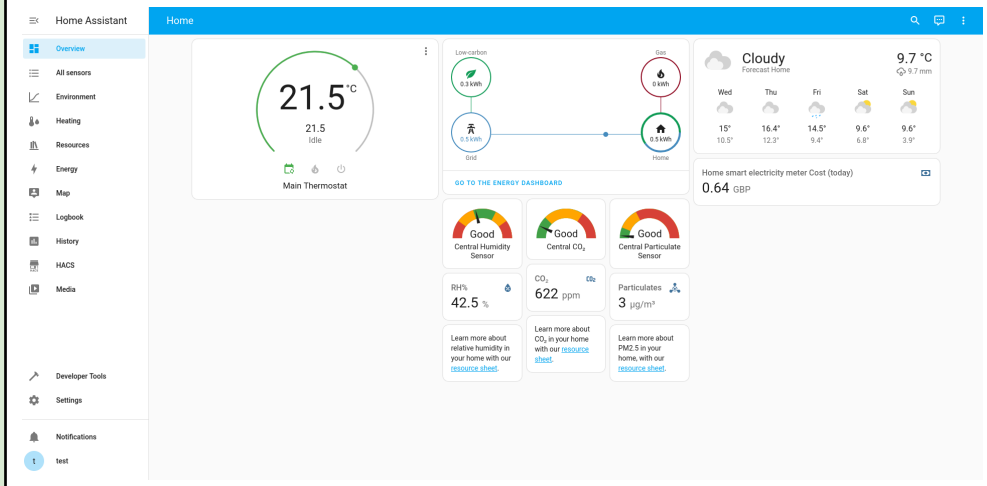
What is it?	Suggested amendments and rationale
Expression of Interest form (F01) - survey form, can be completed by householder online, or over phone with engagement officer.	Moved from F02: ● How long do you envisage living in your home? Add - “Less than 2 years” option *This would be considered a 'non-routine event' in post-works data and require removal from a portfolio. We therefore want to avoid this scenario.* Add: ● Do you have a working smart meter? ○ Yes - for electricity and gas ○ Yes - but only for electricity ○ Yes - but only for gas ○ No - I don’t have any smart meters (this means your meter readings are not automatically sent to your energy supplier) ○ I don’t know ● How long have you had your smart meters? ○ Longer than 12 months ○ Less than 12 months ○ If less than 12 months, when (approximately) were they installed? (month and year): ○ I don’t know ● Do you have an internet connection in your home? (by this we mean a wired connection with a router) (Note: this may not be required if basic battery operated temperature sensors are deployed in support of the MES+HTC method).
Householder detailed survey (1) (F02a) - survey form, can be completed by householder online, or over phone with liaison officer.	Replace: “How long have you lived in your home” with “When did you move into your home? (day, month and year)” *Rationale: a change of occupancy during the baseline period would be a non-routine event. This may not be a significant issue if a scheme is likely to take several months to get to the stage of retrofit works being installed.* Remove the following question and add to the F01 form instead: How long do you envisage living

	in your home? *Rationale: to avoid abortive applications.* *Add:* "Have any of the following happened within the last 12 months?" - Change from a gas hob or cooker to electric. - Change to your gas heating system (e.g. replacement boiler) - Change to your gas based hot water system (e.g. replacement boiler, adding or removing radiators) - Major changes to the way you occupy your home? (e.g. shift to working from home, retirement, having a young child, becoming a carer) *Rationale: may affect baseline period and training of the model.* *The following would be important to capture if the MES methodology is further developed for homes that are also heated electrically pre-retrofit. However, a Retrofit Provider who is evaluating a scheme more widely (i.e. not just a MES metric) and may offer other services may have other reasons to include these as standard.* For "Does your home have any of the following measures?" ... Add: Electricity battery, Electric vehicle charging Add: Were any of these installed within the last 12 months? *Rationale: may affect baseline period and training of the model.* Add: If you have solar PV, and it was installed within the last 12 months, is this separately metered for the amount of electricity you export (don't use yourself)? Yes No I don't know *Rationale: may affect baseline period and training of the model.*
Householder detailed survey (2) (FO2b) - survey form, can be completed by	Section: A bit more about you and your home Remove: Do you have a smart meter? *Rationale: now asked in earlier forms.*

householder online, or over phone with liaison officer.	Remove: Do you have the internet at home? *Rationale: now asked in earlier forms. May not be required on a MES demonstrator or scaled programme if basic battery operated data loggers are used.*
Householder questionnaire for Home Retrofit Planner - this qualitative element is pre populated before the assessor/surveyor completes the site visit (F03)	Home Retrofit Planner is an assessment and scenario planning tool (based on full SAP but with several additions) owned and managed by People Powered Retrofit. It is the preferred tool for assessments undertaken as part of Carbon Co-op ABS projects. There is some overlap here with other surveys, but only new or relevant questions are posed to householders participating in an ABS. Our review has highlighted some worthwhile considerations for the custodians of Home Retrofit Planner in aligning with a future MES programme. For example: • How long do you see yourself living here? Add an option for less than 2 years. • Ask when a smart meter was installed - so as to gauge whether there will be sufficient baseline data. • What has already been done, by you or previous residents? Ask whether any of these were within the previous 12 months. • Are you planning other works? Ask if there is a rough time frame, as this may affect the baseline period. (*PPR feedback indicates a wariness to put timescales on data fields - because inevitably things take longer than people think they will. However, they could add something to the prompt so that any relevant information is captured by the surveyor in the notes section).*
Stage 1 contract - to be developed on future ABS	On future ABS schemes the team have identified that a two stage contract with householders would be preferable. This minimises the risk for the Retrofit Provider (in the event of dropouts, which can happen for many reasons beyond the Provider's control), but also brings more clarity for householders. It will be important for MES team input to be sought on the drafting of this, to check whether any data requirements need to be included.
Smart meter service	This is an established process already. A user account is created, and this prompts an email to

enrollment	the householder to set a password. They can then proceed to the smart meter service sign-up and follow the step by step instructions. In the current phase of the ABS this process has worked well, with householders finding the process easy to navigate. None have required support to pass through the web sign-up and enter their In Home Display (IHD) display number to verify the connection. One connection has failed due to the smart meter not working. The following are issues that householders sometimes require support in resolving: - Identifying the right code on the IHD - this is due to the variation in models. Photo prompts can be useful in overcoming this. - Thinking that they need to provide separate codes for the gas and electricity connection - only one code from the IHD is required for both fuels to be connected to the service. Once connected, the team often finds data quality issues (such as gaps). Querying and resolving these is currently a relatively manual process between Carbon Co-op and the smart meter provider - for MES to scale this will need streamlining.
Smart meter data issues - template letter for householders to send to energy supplier	Currently the responsibility for fixing a smart meter that isn't working falls on the energy supplier. The team are looking at developing a template letter for householders to use when liaising with their energy supplier, in the hope of encouraging a resolution. For some households the smart meter Data Communications Company (DCC) connection is poor, but good quality data can be secured through use of a Consumer Access Device (CAD), which can also provide more granular data. This is relatively simple to set-up via the smart meter provider, with a cost of around £60-80 per household.
Engagement officer FAQs on data and monitoring equipment	This was suggested as a potentially helpful addition for engagement/householder liaison roles on a scheme. The current phase of the ABS in Levenshulme generated some very basic householder facing materials to show what the different parts of the monitoring kit do. This proposes an additional simple resource for engagement staff on the method and any sensors required, which can be referred to if/when a householder wants more information.
Joining up assessment	We identified a shared value point between assessment organisations (in this case also a One

service	Stop Shop (OSS) for private householders) and those hosting smart meter services. This would consist of prompting those receiving an assessment to sign up for the smart meter service. A joined up approach would allow the smart meter data to be input as the baseline energy usage figure in the energy modelling, streamlining a currently manual process of obtaining energy bills. This would also support the earlier onboarding of householders to smart meter data sharing. Carbon Co-op has plans to explore this integration further as part of a partnership project with People Powered Retrofit and others under the Green Homes Finance Accelerator (GHFA) programme.
Monitoring kit training for householders	For a minimum level of MES scheme this may be unnecessary (e.g. where basic data logger is used for temperature), but this could be integrated if the Retrofit Provider approach included more monitoring kit and a way for householders to view that data via a dashboard (as on the current Carbon Co-op ABS in Levenshulme – examples shown below). 


Home Assistant
Home
Overview
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Developer Tools
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21.5 °C
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Grid
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GO TO THE ENERGY DASHBOARD
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Home smart electricity meter Cost (today)
0.64 GBP
Good
Central Humidity Sensor
Good
Central CO2
Good
Central Particulate Sensor
RH%
42.5 %
CO2
622 ppm
Particulates
3 µg/m³
Learn more about relative humidity in your home with our resource sheet.
Learn more about CO2 in your home with our resource sheet.
Learn more about PM2.5 in your home, with our resource sheet.

Design stage

No engagement materials were identified of relevance at this stage. Householders on the current phase have completed a design questionnaire, but this does not include any relevant data points for metered energy savings.

Installation stage

At the installation stage, the focus is on management of works and contractors on-site. From a metered energy savings perspective, this is during the intervention window so doesn't affect the MES calculation. However, it could be a point at which to ask whether the householder has:

- already commissioned any other works outside of the ABS contract, or
- actively planning any extra interventions post-works that may impact energy use.

Feedback from the current phase of the ABS in Levenshulme suggests that this may be relatively common in a private householder context. For example:

- householders already considering further fabric works, such as more disruptive measures like floor insulation (even on a DIY basis)
- Going for 'optional extras' like replacement windows and doors to the front of the home (these items are technically outside of the ABS contract, but potentially ordered at the same time to take advantage of efficiencies in design and manufacture)

Key engagement materials identified:

What is it?	Format
Householder survey mid-way through works (F04)	Suggested adding questions: Are you considering or actively pursuing any additional work beyond this scheme that may affect your energy use? If so, what are they? - Further replacement windows and doors - Further insulation - Solar PV (generate electricity) - Battery - Electric vehicle charging - Replacement heating system (same fuel) - Replacement heating system (change to electrically heated, such as a heat pump) - Other (please state): If you are planning additional works, when are these likely to be installed?

	- Within the next 12 months - Between 12 months and 2 years in the future - Over 2 years in the future *Rationale: if the first option is selected, the Retrofit Provider may need to follow-up to gather more information. Whether/when any other works get installed can often be wildly out of initial guesses made by a householder.*
Construction phase info pack for households	In summary this document summarises the works taking place, introduces key contacts, explains what the householder needs to do (insurance, party wall notices etc, as well as providing clear access for trades), explains the likely level of disruption, and what to expect once works are finished. The last section will prime householders for any data/feedback requests in the post-works/calculation period. This will include: - They may be contacted if the data feed fails (e.g. smart meter data drops out, sensors stop working) - They will be asked to fill out a survey 1 year post-works to capture qualitative outcomes. This survey will also ask about any non-routine events that occur during the post-works period, that we may want to explore further (in methodology terms, or to remove a property from a portfolio wide MES calculation).
Mid way check-in	Only reactive/as prompt - if smart meter or sensor data quality fails.
Ongoing Info Emails / Call / WhatsApp / Text	Only reactive/as prompt - if smart meter or sensor data quality fails.

Handover stage

At handover stage householders will be provided with materials and a home user guide to ensure they are familiar with, and can operate their retrofitted home effectively.

Key points for a potential Beta pilot with metered energy savings:
Whilst this stage may not be an immediate trigger for metered energy savings, it is a relevant point to engage householders and other key stakeholders in documenting:

- Completion dates - required for an accurate intervention window, which any MES method will require.

- Priming householders for future evaluation - for example, any follow-up/qualitative surveys that we (or a wider delivery team) may wish to include.

In the context of any scaled MES programme with linked finance, handover activities should be viewed as a critical part of minimising any performance gap due to misunderstood measures or poor operation and maintenance.

Key engagement materials identified:

What is it?	Suggested amendments and rationale
Handover pack	This is usually a PDF and printed user friendly guide to the measures installed, and overarching retrofit approach. It is accompanied by copies of required info: product datasheets, manufacturer/supplier Operation and Maintenance manuals, guarantees etc. It would be best practice to: - prime householders for any requests during the post-works period as part of this guide. This can be relatively light touch - provide contact details should the householder notice any issues with their smart meter or sensor data feeds, or have any questions - Include basic information to help householders access and interpret any smart meter or temperature data (if this access is provided).
Handover visit	This usually accompanies handover packs and other materials. It is used as an opportunity to demonstrate physical things which can be shown in-person, and show householders where to find user manuals etc. For MES this is a light touch stage, but it would be worthwhile including any reminders to avoid tampering with temperature sensors during the monitoring period.
Householder interviews (small group)	On pilot/early ABS schemes there are likely to be other activities around completion, such as semi-structured interviews. These should focus on qualitative aspects and householder experience - as such we don't envisage any MES related questions.
Monitoring equipment uninstalled/returned (optional)	In the current phase of the Levenshulme scheme monitoring equipment (some of which has been funded under a European research project) will be owned by the householders at the end of the monitoring period. On a MES pilot or scaled programme, any temperature sensors deployed are likely to be lower cost (potentially battery operated data loggers). This will require either: - Return by householders to the data processor/Retrofit Provider (e.g. in a self addressed

	envelope) - Retrieval by the Retrofit Provider. If there is potential for MES calculations that require temperature data over longer timescales (most likely if linked to funding criteria), then the suitability of battery operated loggers will need to be considered. The ongoing costs of sensor installations and retrieval will also need to be factored into planning.

Evaluation stage

At this point householders participate in a post-works survey as a minimum - these tend to focus on qualitative data. There may also be other evaluation activities depending on the scheme and it's funding requirements, for example:

- more in-depth qualitative research, such as interviews and focus groups
- more in-depth Building Performance Evaluation techniques - although these are usually only justified and triggered if initial feedback suggests that something is not working as intended, or satisfaction is low. Some of these techniques are more intrusive (such as investigative surveys).

Data analysis and reporting are key 'back-end' activities at this point. This often requires a degree of 'triangulation' between quantitative and qualitative data points.

Key points for a potential Beta pilot with metered energy savings:

The time at which the metered energy savings calculation is done will depend on the chosen methodology (internal sensor data requirements etc), and may also link with broader evaluation activities which follow in later months.

Reporting is also relevant here, and the team may need to ensure that the methodology and metrics can be clearly explained to a range of stakeholders and funders.

Engagement staff highlight that care is needed in how evaluation is approached as, depending on the scheme objectives, it may touch on quite personal data and thoughts (for example, about health, wellbeing and affordability). Even more quantitative data collection (such as smart meters) can be perceived by householders as very personal due to the level of granularity it offers in how they occupy their homes. These concerns can be mitigated to a degree by embedding evaluation messaging from the beginning, and being clear about the rationale for collecting data.

In addition, the more potential partners and stakeholders there are in a retrofit programme, the more care is needed as this can quickly become confusing. On early stage schemes and pilot programmes, data asks from various partners also tend to be incremental. Delivery staff stress that this needs to be managed carefully to avoid creating confusion for staff and householders around data sharing and privacy. Ideally messaging in materials is co-ordinated and not duplicated, with the Resident Liaison role the key conduit for contact with the householders. Ideally consent for sharing data is also co-ordinated, although whether this is achievable will depend on the design of the particular retrofit scheme, number of partners and coordination between these.

Delivery staff also caution that even engaged householders are not great at responding to surveys promptly. This may require closer consideration of methods and incentives for any data collection within post-works periods.

The approach taken on the current phase of Levenshulme was considered best practice, in that it offered a 'two way' relationship with data. While a lot of data is being collected as part of monitoring systems, householders have been provided with a user friendly dashboard to allow them to access and learn from it. This is felt to foster more goodwill amongst householders. While data on a MES programme is unlikely to be as extensive, it could borrow aspects such as:

- Access to smart meter data as part of the smart meter service sign-up (e.g. PowerShaper Monitor)
- Offering a spreadsheet export of internal temperature data, with some basic pointers on how to create graphs and interpret it qualitatively.

Key engagement materials identified:

What is it?	Suggested amendments and rationale
Post-works survey (1 year post works) (F05)	This is currently envisaged as the final survey of the Levenshulme ABS (current phase). It includes a range of qualitative questions about confidence and understanding around energy efficiency, their perceptions of comfort, health, wellbeing and ease of operating their home post-works. It also gathers satisfaction with the process. This is often supplemented by more in-depth qualitative evaluation on pilot phases. In relation to MES, we suggest a minor addition to this survey, to capture any subsequent works done since completion and that may affect the MES calculation. Add: Since works were completed as part of the ABS scheme, have you installed any additional works that may affect your energy use? If so, what are they? - Further replacement windows and doors - Further insulation - Solar PV (generate electricity) - Battery - Electric vehicle charging - Replacement heating system (same fuel) - Replacement heating system (change to electrically heated, such as a heat pump) - Change from gas to electric cooking - Replacement large appliances (such as fridge-freezer) - Other: Please state an approximate date that these were started and completed (dd/mm/yyyy to dd/mm/yyyy): If you are planning additional works in the near future, what are they and when are these likely to be installed? - Further replacement windows and doors - Further insulation - Solar PV (generate electricity)

	- Battery - Electric vehicle charging - Replacement heating system (same fuel) - Replacement heating system (change to electrically heated, such as a heat pump) - Change from gas to electric cooking - Replacement large appliances (such as fridge-freezer) - Other: (options: Within the next 12 months, between 12 months and 2 years in the future, over 2 years in the future).
Smart meter re-consent process	We have a defined sign-up process for the smart meter service and have implemented a 'reconsent' process (this was required when Carbon Co-op moved from N3rgy to Hildebrand as smart meter data provider). Hildebrand requires annual reconsenting of users. Therefore there will be an automated prompt email to implement. The wording of any reconsent emails will need review on any MES linked pilots or scaled programmes - for example, if there is MES-linked finance then a reminder about why this is important may be needed. If a householder does not re-consent then their data would not be available for any further calculations. (This assumes the current system and requirements of accessing smart meter data remains).
Subsequent years survey (FO6)	Depending on the scope of any MES linked programmes, and methodology development, there may be a need to capture potential 'non-routine events' longer term. This would require developing a set of standardised questions. The approach taken in the US by Recurve is shown in the box below for reference, but we are aware this is likely to be a developing area within the MES sector. Non-routine events might include: - Significant change in occupancy - number - Significant change in occupancy - pattern - Major life event (this could extend as far as a health issue requiring the use of substantial medical equipment at home) - Change in floor area - extension, loft conversion, basement conversion - Further measures - Addition of PV

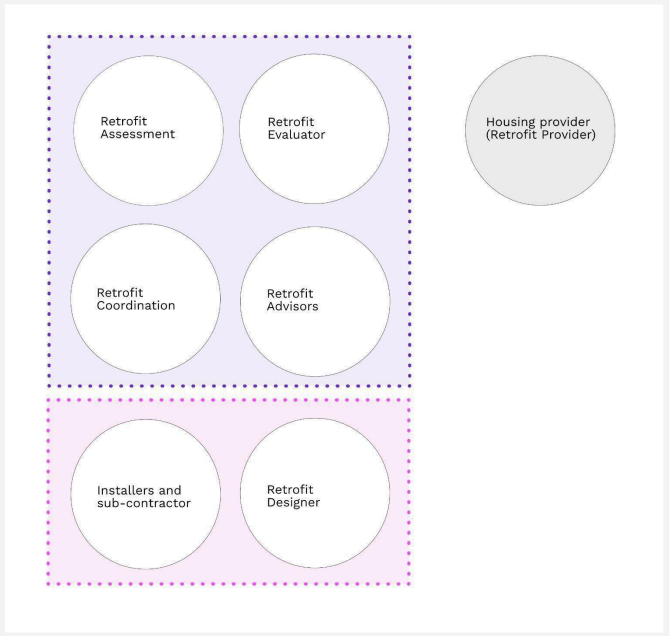
	- Addition of battery - Addition of EV charging - Change in the fuel used for cooking - Change in hot water heating (including any larger consuming systems – such as a pool) - Heating parts of the home not previously heated
Understanding community outcomes	In response to feedback from delivery staff about engendering goodwill and a 'two way relationship' on data with householders, on a pilot programme we could consider the development of a skeleton report/slide deck to communicate scheme outcomes to participants (and potentially wider stakeholders). This might include the following: - individual/property level MES calculation (suitably caveated for accuracy and under/overestimation) - Cohort/portfolio wide MES calculation ("as a collective, you have avoided x kWh etc") - Internal temperature trends post-works ("you now tend to heat your home to X degrees Celsius") This could be extended by Retrofit Providers to report other metrics of interest, such as comfort and satisfaction, carbon, bill savings etc.

Example 2: Manchester City Council Social Housing Decarbonisation Funding (boiler replacement scheme)

Project overview

This potential MES pilot relates to social housing managed by Manchester City Council Housing Services. The council's current Social Housing Decarbonisation Fund (SHDF) programme includes 6 projects across different parts of the local authority. During RetroMeter Alpha we focused on the potential to integrate with the boiler replacement strand, which involves switching around 1,000 homes from gas boilers to Air Source Heat Pumps (ASHPs).

The general differences in a SHDF type approach from an ABS type scheme are documented in more detail in deliverable WP4 D3, but it is worth stating the particular procurement model for this example as this shapes the roles and activities in delivering householder engagement.



Described as a 'Managed Assessment Coordination and Evaluation Model (MACE)[8],' the funding body (in this case MCC) contracts the Assessment, Coordinator and Evaluation parts of the process to one organisation. This ensures that the Coordination function, primarily a client and resident protection role, is divorced from the Design and Install.

[8] For more information on PAS2035 contracting models, see Retrofit Academy CIC and Local Energy North West Hub 'Contracting for PAS2035 compliant retrofit: guidance for local authorities'

Resourcing within Manchester City Council
The departure of the key contact at Manchester City Council's Net Zero Housing Team coincided with the start of the RetroMeter Alpha project, and this created challenges with the flow of information. A temporary appointment was made in lieu of a permanent replacement (due to start at the end of March 2024), but only on a 1 day/week basis, and covering 4 research projects in total. Despite weekly check-in meetings it has been difficult to progress actions week-on-week. The overlap in data requests between projects and external partners has on occasion confused and delayed requests too.

Budgetary constraints
Increasing costs in tender returns impacted on the scope of measures, with ASHPs prioritised over other fabric works. The rigid timescales for SHDF funding delivery, and limited funds from Housing Revenue Accounts compounded this. Changes to budgets and the number of homes that can be included in programmes often needs to go through the council's internal approval processes which also takes time. All of these issues delayed engagement work with households.

Procurement and engagement delays
Time is also needed for procurement, and to handle delays that only come to light once 'on the doorstep.' This includes tenants refusing access for surveys.

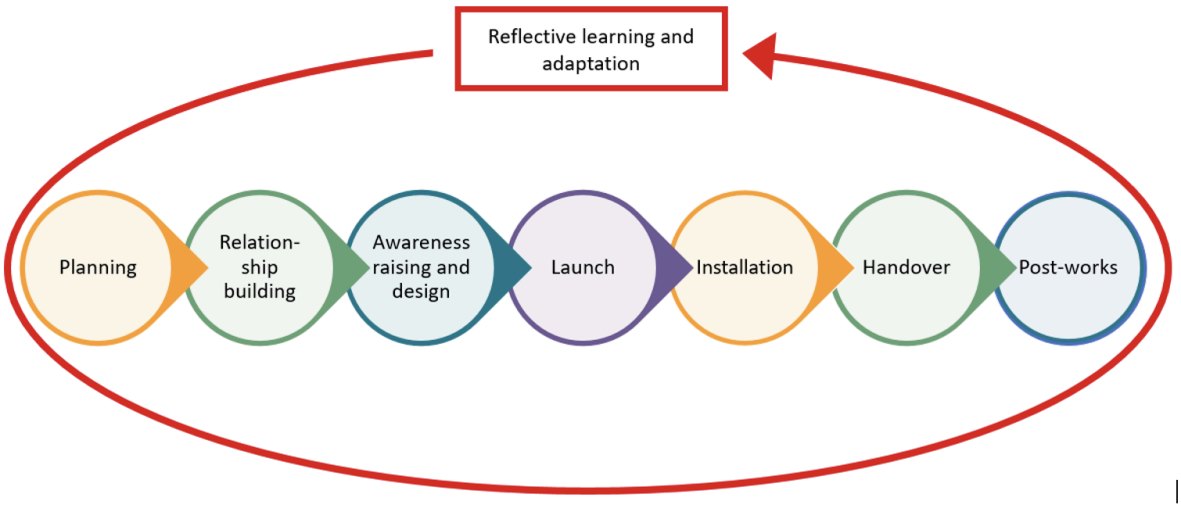
Housing asset data
The move by the City Council in 2021 to take social housing management back-in house (previously this was under Arms Length Management Organisation (ALMO) Northwards Housing) requires integrating IT infrastructure and asset data - a process that is still ongoing. This created challenges during Alpha as information was not easily accessible. However, we understand this process should be more streamlined in future phases of retrofit delivery, because the council will by then have migrated the asset data and have coordinated IT systems.

The housing data held in-house is often sparse, and MCC does not hold information on which of their homes have smart meters. This is likely to be a challenge shared across the housing provider sector. During the course of Alpha we requested but have been unable to secure:

- The data framework for the retrofit assessments to assess the building and occupancy data collected pre-retrofit, and where possible;
- The anonymised retrofit assessment data for surveys completed to understand the baseline and predicted savings;
- That a question about smart meter availability was added to survey forms.

Engagement approach

Engagement planning on the boiler replacement programme is still a work in progress, and it is not possible to comment on specific materials because of this. The engagement process is broadly defined across 7 key stages, with a further continuous cycle of 'reflective learning and adaptation.' The stages are shown in the image below, taken from the council's draft engagement guide. Planning and relationship building (stages 1 and 2) are generally internally facing activities with consortium members and partners, with householders actively engaged in the process from stage 3 (awareness raising and design) onwards.



The table below shows the scope and method of engagement across these general stages.

Stage	Awareness raising and design >	Launch >	Installation >	Handover >	Post-works
The current process (high level - there will be some variation by project).	What: retrofit project summaries and key messages. Materials: letter to each household, followed up by personal conversations via door knocking, exhibitions/drop ins, email and phone helpline.	What: sign-up/agreement to work. Energy monitoring equipment should be installed. General updates. Materials: Letter to each household, followed up by personal conversations via door knocking, exhibitions/drop ins, email and phone helpline.	What: measures installed Materials: bespoke newsletter, articles in local newsletters/e-bulletins (including case studies where possible), posters advertising drop-ins and celebration events, banners/signage with targeted messaging if relevant.	What: handover pack/activities and post-installation feedback survey. How: door knocking, drop ins, email and phone helpline.	What: check-in and PAS2035 post-occupancy surveys. How: door knocking, email and phone helpline.
Actions that would be required to facilitate Metered Energy Savings calculations.	Early data collection about smart meter availability. Smart meter on-boarding and sensor installation. Early engagement to troubleshoot metering issues.			Date of sign-off required for the intervention window (which must be discounted from calculation). Handover materials act as primer for post-works evaluation activities.	

Example engagement activity: heat pump trailer

The MCC boiler programme team intends to use a Daikin heat pump trailer as an engagement activity with households. Residents will be invited to drop in and see the technology in-person. It is hoped this will help secure sign-ups and minimise refusals, support myth busting and improve householder understanding of how to operate heat pumps effectively. This will be situated in local supermarkets in the target areas in North Manchester over two, two day periods in May (after local and Mayoral elections in Greater Manchester). The trailer will be staffed by Daikin engineers and engagement staff, as well as MCC staff.

The following organisations and roles are involved in organising and delivering this kind of engagement activity:

- Installer representative (Resident Liaison Officer)
- Heat pump manufacturer (Engagement lead)
- Manchester City Council (Tenant Liaison Officer)
- Engagement contractor for the council
- Council tenant communications lead (send letters etc)
- Council Climate Change Officers and Neighbourhood leads (likely to play a proactive role in door knocking and distributing flyers to encourage attendance)
- Other parties as applicable (e.g. heating controls/monitoring kit supplier like Switchee, research partners like Carbon Co-op).

Various parties highlighted that securing good footfall at these events can be very difficult. It is likely that voucher incentives will be provided (e.g. if you attend you'll be given a voucher to spend at the supermarket cafe). This kind of in-person engagement work also presents opportunities to encourage smart meter service sign-ups on future phases of retrofit delivery, as long as the messaging and materials are co-ordinated.

Engagement guide

Manchester City Council were able to provide us with access to their draft engagement guide on a 'commercial in confidence' basis. This document (still in draft form during Alpha) was devised by Forever Consulting in consultation with key staff at the city council. It is designed to shape not just this SHDF programme, but their approach to engagement across retrofit scheme delivery generally. We have been able to analyse this draft guide and suggest where an MES approach could be integrated and/or add value. This review was also useful at highlighting actions that MES teams may need to consider as part of any pilots or scaled programmes. We have not included the detailed analysis in this report due to the 'commercial in confidence' request.

The items we highlighted as priorities related to those likely to be required to enable a MES pilot/demonstrator, and that may require action by one or both parties (i.e. the Retrofit Provider and/or MES parties). These primarily related to issues such as:

- The length of evaluation programmes - if following PAS evaluation timelines, these are not likely to be sufficient to capture non-routine events that could inform a MES calculation and reporting.
- A demonstrator would need to make further efforts to support the principle of consistent and coordinated messages, avoiding duplication and engagement fatigue.
- Inclusion of MES parties within a programme's core engagement team, to ensure the concept and data requirements are built in as early as possible.
- MES findings may introduce tensions with some of the messaging used in general engagement activities. For example, the degree of savings realised may be less than anticipated, or non-existent. This may require adapting language around benefits in order to better manage expectations (e.g. "could" instead of "will.")

Key actions we identified for MES parties for a demonstrator project included:

- A data collector/access gateway role (such as Carbon Co-op in this instance) will need to build relationships with engagement leads on projects.
- Further testing and refining of householder facing tools within a MES service (such as smart meter service web interfaces), particularly in light of under-represented and under-served residents. The current PowerShaper Monitor sign up page will meet a need for some, but not others. This further strengthens the argument for sign-up support and resources. Our current plans include options for contacting Carbon Co-op via WhatsApp, phone, email in order to speak to Carbon Co-op engagement staff to guide through the smart meter sign-up process. Other engagement methods may need to be devised as learning accrues. This may include the need for translated materials or services, such as support from trusted peers.
- The need to consider the staff time and materials costs of resourcing MES engagement with households.

Feedback on the detailed analysis was requested from MCC but not available at the time of finalising this report.

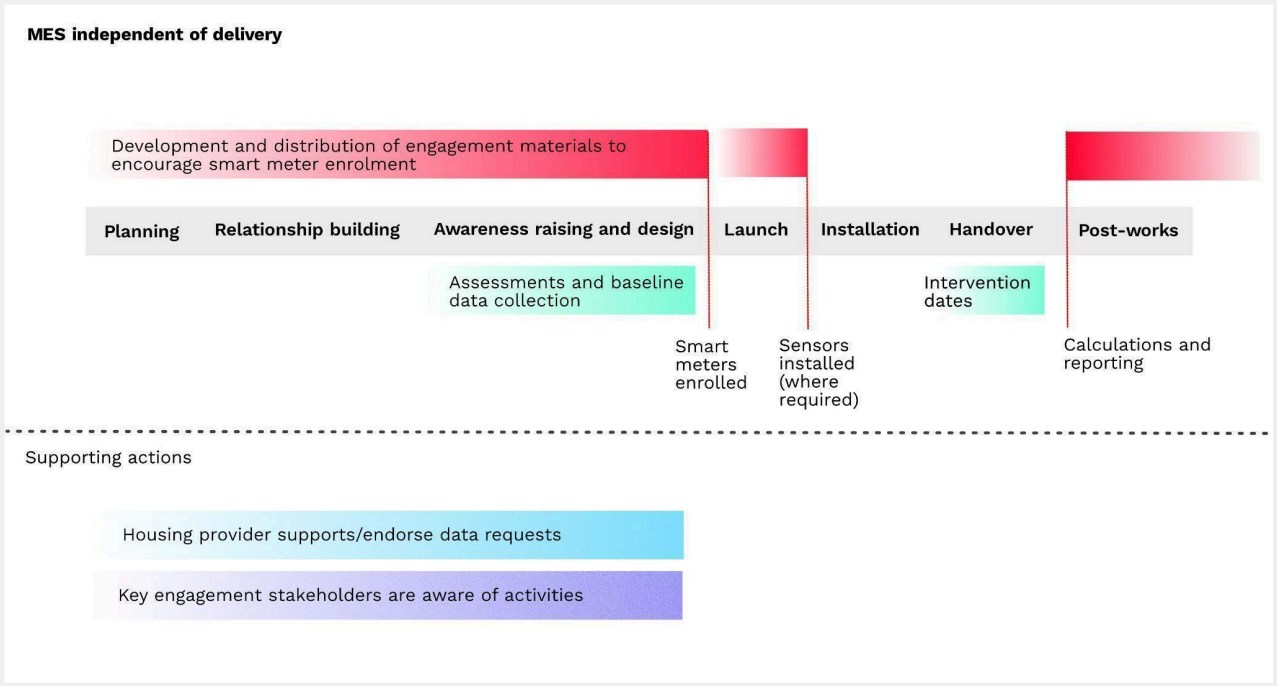
Engagement routes identified

During Alpha three routes to securing the data needed for a MES calculation were identified. These are:

1. MES engagement independent of delivery
2. MES via monitoring solution
3. MES via heat pump manufacturer monitoring

1. MES independent of delivery (direct approach to householders)

The first route is an option where the landlord isn't putting in any monitoring systems as part of the retrofit programme. It is essentially a bolt on to a project where there's only basic evaluation happening as part of PAS2035 compliance.



Key characteristics	Opportunities	Challenges
This introduces Carbon Co-op (or others) as an additional party in the delivery of home improvements to tenants.	The separation of a monitoring/smart meter offer from the landlord or installer could be attractive as it is perceived to be free of their influence or potential bias.	This approach gives us some uncertainty about uptake, although we believe this could be mitigated if the provider was part of early stage awareness raising

Key characteristics	Opportunities	Challenges
	The involvement of a trusted and expert community intermediary in evaluation activities could give the householder confidence.	activities (known amongst key local stakeholders etc).
The onus is on the householder to sign up for smart meter services.	This an opportunity to engage householders on the value offered by smart meter data.	The cost of any incentives required (vouchers etc) will need to be factored into the MES model.
Requires some integration with housing provider wider processes.	The process established in the council's engagement guide provides an opportunity for better integration with engagement work in future.	Constraints in engagement resourcing within housing providers and local authorities (e.g. sign off of materials) could delay the production and distribution of materials during time critical windows.

Engagement materials and testing:

During RetroMeter Alpha we drafted materials (a booklet) to test this approach and explored avenues for distributing this, including:

A. **A direct mailout or distribution through letterboxes**: this has not been possible to date due to delays getting Data Sharing Agreements through MCC legals, but is the preferred method.
B. **A mailout by MCC (booklet plus council supporting letter)**: while this would get around delays in data sharing this has not been possible to date due to uncertainty over the properties being included in the programme.
C. **Distribution via the Retrofit Assessment contractor (when doorstepping to secure access for retrofit surveys):** this is the option being pursued as of March 2024.

The booklet and messaging being tested is shown in Appendix A. The main engagement hooks we are trying to test are:

- Voucher incentives for signing-up
- Householders playing their part in making retrofit process better (through better understanding of energy savings delivered)
- Householders having better access to their own smart meter data.

The key actions the booklet seeks to drive are:

- Householders signing up to share their smart meter data
- Householders agreeing to host temperature sensors.

Next steps beyond SIF Alpha

Carbon Co-op will be following the progress of the booklet and resulting sign-ups beyond the close of the Alpha stage SIF project, with a view to securing the learning that can inform future pilots and scaling programmes. This includes taking on the cost of a limited number of incentive vouchers from Carbon Co-op's core funding, and supporting householders through smart meter sign-up. This will be particularly interesting in terms of the smart meter onboarding process, which to date has been used with a relatively energy literate/'early adopter' audience. Tweaks may be required to account for:

- Variable levels of digital literacy and confidence[9]
- Absence of In Home Displays to verify the connection.

In addition to an initial booklet, we have identified the following materials for development:

- Doorstep sign-up processes (e.g. ability to take a householder through smart meter sign-up on the doorstep using a tablet device)
- FAQ/toolkit for supporting households through the process (advisor/engagement officer facing)
- Potential additions to survey forms used during recruitment and surveys, primarily to establish the extent of smart meter data, In Home Displays and internet connectivity availability
- Testing different approaches to installing and collecting temperature sensors - such as householder self-install vs a staff member visiting the home (anecdotal experience from other Carbon Co-op projects suggests that resolving issues remotely can be as (or more) time intensive than undertaking site visits)
- Re-consent prompt emails
- Simple guidance for householders on comparing pre and post retrofit smart meter data.

Rather than duplicate materials, we will continue to seek input on the MCC engagement guide templates and toolkits as a means of doing this.

[9] Carbon Co-op's smart meter service is also being utilised by a national fuel poverty charity for their engagement work. No specific requests to change the sign-up process have been made to date, but we could seek further feedback from partners like this on a follow-on project.

Case study: Incentivising data sharing on large scale evaluation programmes

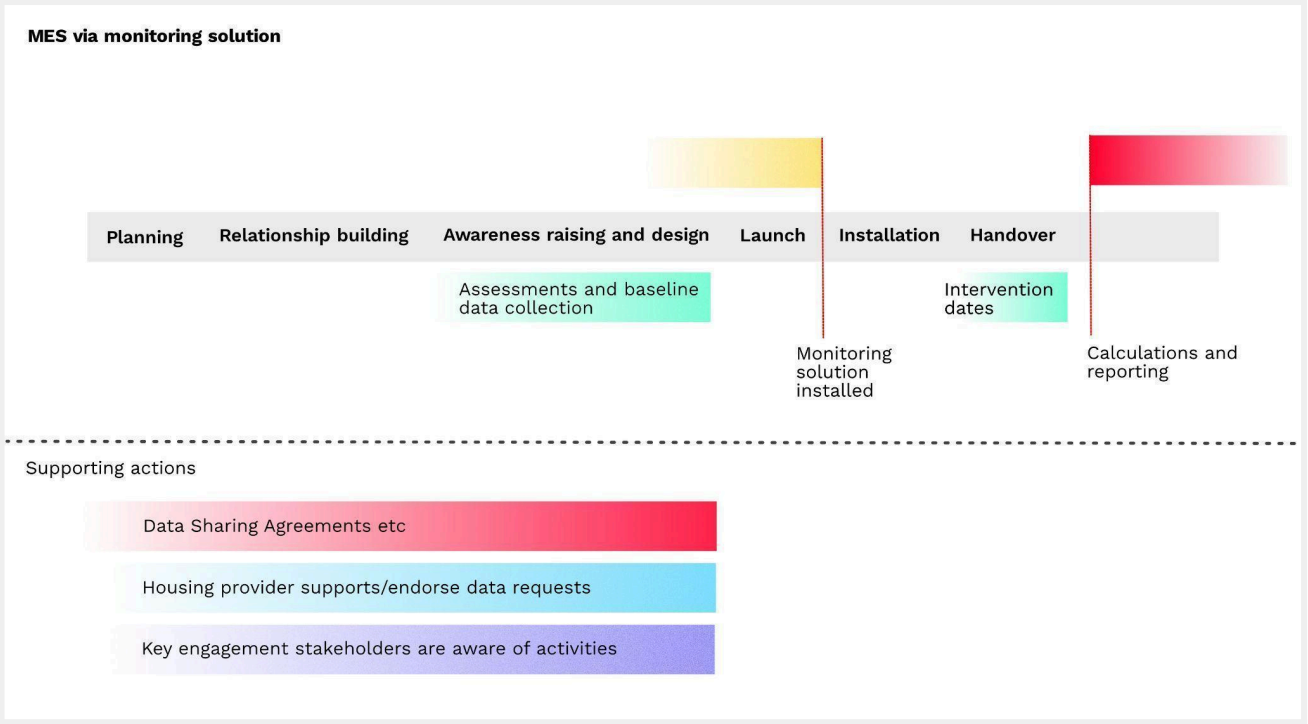
Research studies that seek to recruit large numbers of households offer learning around recruitment and securing consent for smart meter data. One such study was led by UCL's Energy Institute and related to recruitment to the Smart Energy Research Laboratory (SERL) (Webborn, E *et al.,* 2022). In this study they trialled different recruitment approaches, starting with a sample size of 18,000 homes and resulting in the recruitment of 1,711 participants to the SERL Observatory database (a response rate of 9.5%). Key findings included:

- Offering conditional monetary incentives (such as a £5 voucher in this study) is effective, more so than unconditional incentives (such as upfront vouchers or token items like a thermometer), or incentives that offer no guarantee of benefit (such as entry into a prize draw)
- Family oriented messaging, using a structure of 'reasons for participation' and then a 'call to action' were notably more effective (the authors noted the reasons remained unclear and warranted further research)
- "push-to-web approach decreased response but increased online response to a much greater extent, reducing processing costs and improving survey data fidelity" (pp. 9)
- Multiple reminders helped to increase response significantly
- There was under-representation of households in areas of greater deprivation (lower IMD quintiles).

Whilst this study involved targeting much greater numbers of households than the retrofit programmes we have explored, these findings offer some valuable lessons about the monetary incentives that may be required to secure smart meter data and participation in surveys. The under-representation of households in areas of greater deprivation also highlights that further strategies may need to be developed for certain audiences. For example, incentives may need to be higher (we are trialling a £25 voucher with SHDF households) and supplemented by other engagement activities (such as in-person conversations). It is also likely that written materials will be a considerable barrier for some, and that we will need to invest in staff that can explain and support households through consent and sign-up process.

Webborn *et al.,* (2022) 'Increasing response rates and improving research design: Learnings from the Smart Energy Research Lab in the United Kingdom' *Energy Research & Social Science 83 (2022) 102312*

2. MES via monitoring solution (e.g. Switchee)



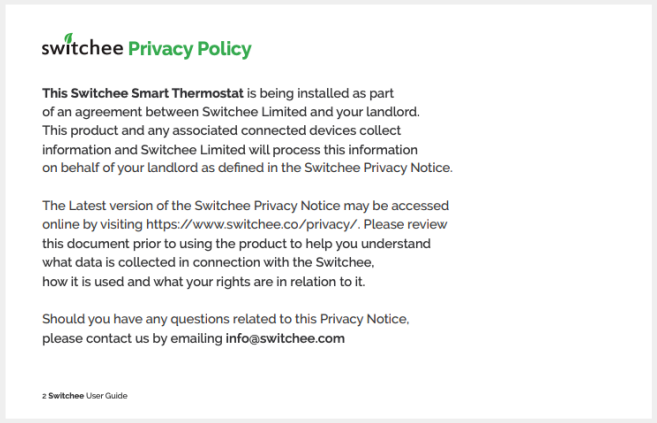
The second route is an option where the landlord is putting in monitoring systems. This is the case on the MCC SHDF programme where Switchee heating controls and monitoring systems are now being installed on all homes within the boiler programme.

Key characteristics	Opportunities	Challenges
Third party (Switchee) installation of sensors and metering add-ons.	This reduces the need for additional resourcing of kit installation.	Longer term, the potential for householders to view data via integrations with a central Data Warehouse. Timescale requirements must be clearly articulated to ensure that data feeds are in place to capture sufficient baseline period data. Moving towards a scaled MES approach underpinned by financial mechanisms, a contracted level of service may need to be put into place to manage risks of data insufficiency resulting from 3rd party systems.

Key characteristics	Opportunities	Challenges
Householders consent via Switchee-led materials, including privacy notices and agreements.	Switchee have growing experience with housing providers and householders - this route provides an ability to 'piggy back' on to their data consent processes with households. Provided data feeds remain for the required period, this approach requires less direct engagement resourcing and communication with residents by MES parties.	Transparency and levels of trust could decrease if data consent and protection is deemed to be of poor quality.
Householder access to data is shaped by Switchee.	Longer term, the potential for householders to view data via integrations with a central Data Warehouse (see WP3 data warehouse proposal)	The Switchee in-home unit acts primarily as a heating controller - householders do not benefit from sight of the data.
The availability of data for MES calculations will be shaped by the length of housing provider agreements with Switchee (for software services).	Longer term, the potential for more centralised agreements or financially self-sustaining models could be put in place via the proposed Data Warehouse (see WP3 deliverable).	A scaled MES approach would need to see data requirements incorporated in standard approaches for Software Services Agreements. It is not uncommon for 3 year contracts on SHDF type programmes - what happens beyond this if the landlord does not commit to ongoing costs?

Engagement materials and testing:

For this route there are no specific engagement materials, with the Switchee standard set of householder facing materials used. This includes:



switchee Privacy Policy

This Switchee Smart Thermostat is being installed as part of an agreement between Switchee Limited and your landlord. This product and any associated connected devices collect information and Switchee Limited will process this information on behalf of your landlord as defined in the Switchee Privacy Notice.

The Latest version of the Switchee Privacy Notice may be accessed online by visiting https://www.switchee.co/privacy/. Please review this document prior to using the product to help you understand what data is collected in connection with the Switchee, how it is used and what your rights are in relation to it.

Should you have any questions related to this Privacy Notice, please contact us by emailing **info@switchee.com**

2 **Switchee** User Guide

The Switchee standard Privacy notice - residents are referred to the website for the most up-to-date version: https://switchee.com/privacy/

Switchee have additional smart meter consent Terms and Conditions: https://switchee.com/smartmeter/

Pertinent points include:

- "...we may also collect up to 12 months of historic data for your home to allow us to understand how your home's energy efficiency is changing over time."
- "We may share your data with partner organisations to contribute to this analysis."
- "We will retain data for as long as your landlord retains a contract with us, to allow your landlord to understand how your home's energy efficiency has changed over time."

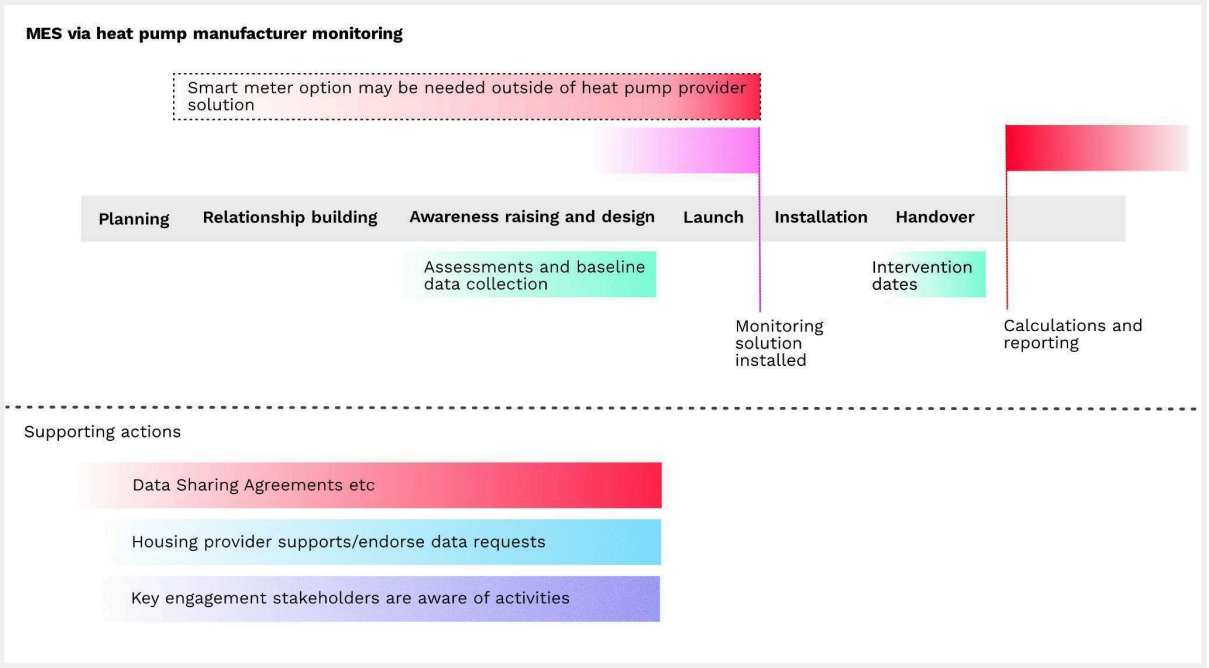
It is worth noting that Switchee's smart meter service is new, and the level of uptake by Switchee tenants is not yet known. As mentioned above, the data being contingent on a landlord's contract with Switchee may be a limiting factor in running MES calculations over a longer term.

Other householder facing Switchee materials include user friendly user guides. These primarily explain how a householder can use the heating controller, but FAQs make reference to what is inside the Switchee unit (i.e. five sensors to temperature, light, humidity, motion and air pressure. It states that these are used to optimise the heating and/or hot water, but not for broader monitoring. However, the Privacy notice does explain the wider purpose for these sensors.

Next steps beyond SIF Alpha:

- With the council now aiming to install Switchee units in all homes receiving works, this should provide a larger pool of prospective households on which a MES calculation could be run. However, the proportion of these opting in to share smart meter data is likely to be less, and we can assume a significant proportion of homes may not have smart meters at all. There may be benefit from exploring collaborations on engagement materials between Switchee and MES research parties to encourage as many sign-ups as possible.
- There may be other issues around data access that need to be smoothed – such as data quality and access to data for research (such as easier dashboard access - these are discussed in more detail in WP4 deliverable 2 on Data Access).

3. MES via heat pump manufacturer monitoring (e.g. Daikin)



The third route is an option where the landlord **is or isn't** putting in additional monitoring systems, because it purely uses data sourced via the heat pump manufacturer. This is the case across the MCC SHDF programme where ASHPs are being installed to a consistent specification.

This option is possible where the housing provider procures equipment separately from the installation contract. On some publicly procured retrofit models this may not be feasible because of the form of contract (e.g. design and build, with specification led by the main contractor). This may result in the installation of heat pumps that do not provide access to such data.

In the case of the Daikin heat pumps being installed under the MCC programme, this solution *could* consist of:

- Daikin home hub™ - a physical box that attaches to the main heat pump
- Daikin Cloud service - which enables troubleshooting and fault finding. This is being extended to include internal temperature.

Key characteristics	Opportunities	Challenges
This is less of a householder facing monitoring solution.	Longer term, there may be an option to integrate this data via a connection to the Data Warehouse (see WP3 Data Warehouse proposal)	

It requires additional components.		Further costs will be incurred for the Retrofit Provider.
It requires that the household keeps the heat pump connected to the internet for monitoring.	Households can be engaged on the benefits of keeping their heat pump connected - such as easier reporting of repairs, and the possibility of making further energy savings.	Householders must have a working internet connection to facilitate data transfer (tenant remit, not landlord).

Next steps beyond SIF Alpha:

- This avenue of data access is discussed in more technical detail in WP4 deliverable 2 on Data Access.
- Carbon Co-op could work with Daikin on engagement materials and approaches to encourage sustained householder connections. We understand new Daikin materials for householders are in progress (template welcome pack, myth busting, simple user instructions etc), and these could be reviewed from a MES perspective once available.

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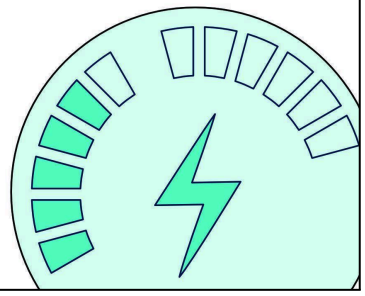
Appendix A: Booklet to encourage smart meter sign-ups on the Manchester City Council SHDF boiler replacement programme

Carbon Co-op

Play your part in improving local homes and get vouchers for your involvement.



Why are you contacting me?

Your home is one of many that your landlord would like to improve in future to make it more energy efficient. These programmes usually focus on changes that reduce heat loss and switch your heating to something cleaner and more efficient.

These things could lower energy use and bills for you, and make your home more comfortable.

But a lot of the time, we don't know if these benefits appear. We're trying to find ways to more accurately measure the benefits of home improvements.

Play your part and get vouchers for your involvement.

Why should we care about actual energy use?

We hear you, not everyone finds energy interesting. But we all pay energy bills - and part of our bill goes towards the cost of running the energy network (getting the energy through the wires and into our homes).

?

Most of the time when we add things like loft or wall insulation, or change the heating system, we make a ‘best guess’ about how much energy or money it will save. But it’s not very accurate for lots of reasons.

We can compare bills before and after, but even then, the weather from one year to the next can be very different. And sometimes we keep our homes a bit warmer afterwards (because they leak less heat), and that’s not a bad thing.

But all these things make it hard for all of us to decide whether it’s worth doing, and it can make it tricky for the energy network if we use more energy than we thought as they need to boost the wires and substations - that costs all of us in the long run.

What is this project about?

We’re looking at how we can make home improvements better by looking at what energy we’re actually using, instead of best guesses.

This information can help landlords like Manchester City Council to plan works that will give you the most benefit in energy reduction and bill savings. It might also help to unlock more money to get the work done because it’s seen as less risky.

To do this, we’re developing methods that use smart meter data, as well as things like local weather information.

What are we looking for?

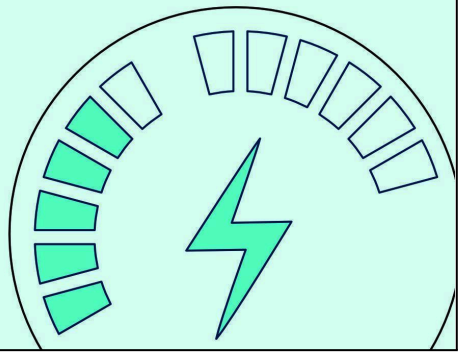
We're looking for:

- homes with **working smart meters**. Ideally your smart meters will have been fitted at least 1 year ago.

Extra vouchers are available for those:

- **willing to host temporary temperature sensors.**

You will need to be a Manchester City Council tenant who lives in a home that has been identfied as likely to need energy efficiency improvements in future. If you received this booklet through your letterbox or directly from a survey company this is likely to be the case.



What do I get in return?

In return for taking part in this research we can offer you:

- **free access to our smart meter service plus a £20 voucher* for signing up** - the display that UK energy suppliers give you usually show a very limited amount of data from the past few days. Our service provides you with all the data at your fingertips for as long as you want to keep it, on any device.

- **a £50 voucher* if you also agree to host temporary sensors** - these will record temperature and humidity in your home over a period of time.

By taking part you could **learn more about your home energy use** (and temperature and humidity). This is helpful in understanding whether there is a change in your energy use and bills after any future improvements are made.

Do I have to take part?

We'd love you to, but it's not compulsory. If you don't take part it won't affect your eligibility for future improvement schemes by your landlord.

There are benefits to you getting involved, such as vouchers, and better access to your smart meter data to help you understand whether works make a difference.

You'll also be playing your part in making our homes genuinely warmer, more comfortable and affordable to run.

*** Voucher information**

- Vouchers are subject to availability.
- A limited number of vouchers are available.
- Only one application per eligible home.
- Up to 150 vouchers are available for smart meter sign-ups.
- Up to 10 vouchers are available for hosting sensors.

Terms and conditions for the vouchers are available at mcc.powershaper.io or by contacting us.

How do I sign up?

Sign up for our free smart meter service here:
mcc.powershaper.io

The website will take you through the process step-by-step.

You'll need a code from your In Home Display to prove that this is your meter. You only need the code - the display does not need to be plugged in or connected.

There's a useful description of an In Home Display on this advice page from the Centre for Sustainable Energy: www.cse.org.uk/advice/smart-meters

To find out more about getting home sensors:
Contact us on the details below.

Got questions? Like someone to take you through the smart meter sign-up?

You can email, ring or WhatsApp if that's better for you:
support@carbon.coop
WhatsApp: 07912 573923
Office: 0161 820 1273

People powered, not fossil fuelled

Who are Carbon Co-op?

We're a Community Benefit Society (not for profit) based in Manchester. We run projects and services that support people and communities around energy use and climate change.

Who else is involved?

This project has the support of your landlord, Manchester City Council.

CarbonCo–op www.carbon.coop

MANCHESTER CITY COUNCIL www.manchester.gov.

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WhatsApp: 07912 573923
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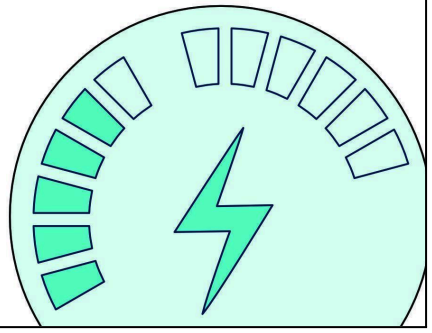

Appendix B: example flyer for use in recruiting households as part of an Area Based Scheme

CarbonCo–op

<Insert neighbourhood name> Home improvement scheme

The <xxxx> home improvement scheme is offering a number of homes in the <xxxx> area grants and loans for home improvement works focused on making homes easier to heat in winter, and stay cooler in summer. This could include better insulation, windows, doors and ventilation.

You'll be guided through the scheme by Carbon Co-op, a non-profit making community organisation. It is supported by <community anchor org> and <anchor institution>.

We're trying to find ways to more accurately measure the benefits of these kinds of home improvements. If you take part you'll be contributing to this important research. For this reason we're looking for homes with:

- working smart meters
- a willingness to host monitoring sensors and complete some questionnaires.

To find out more about the scheme and how you can be involved, please contact the Carbon Co-op team at:

retrofit@carbon.coop

0161 826 1153

carbon.coop/<project url>

+ Logos - e.g. community anchors, anchor institution, other partners as applicable

Flyer reverse

Image of home from phase 1

Testimonial from household