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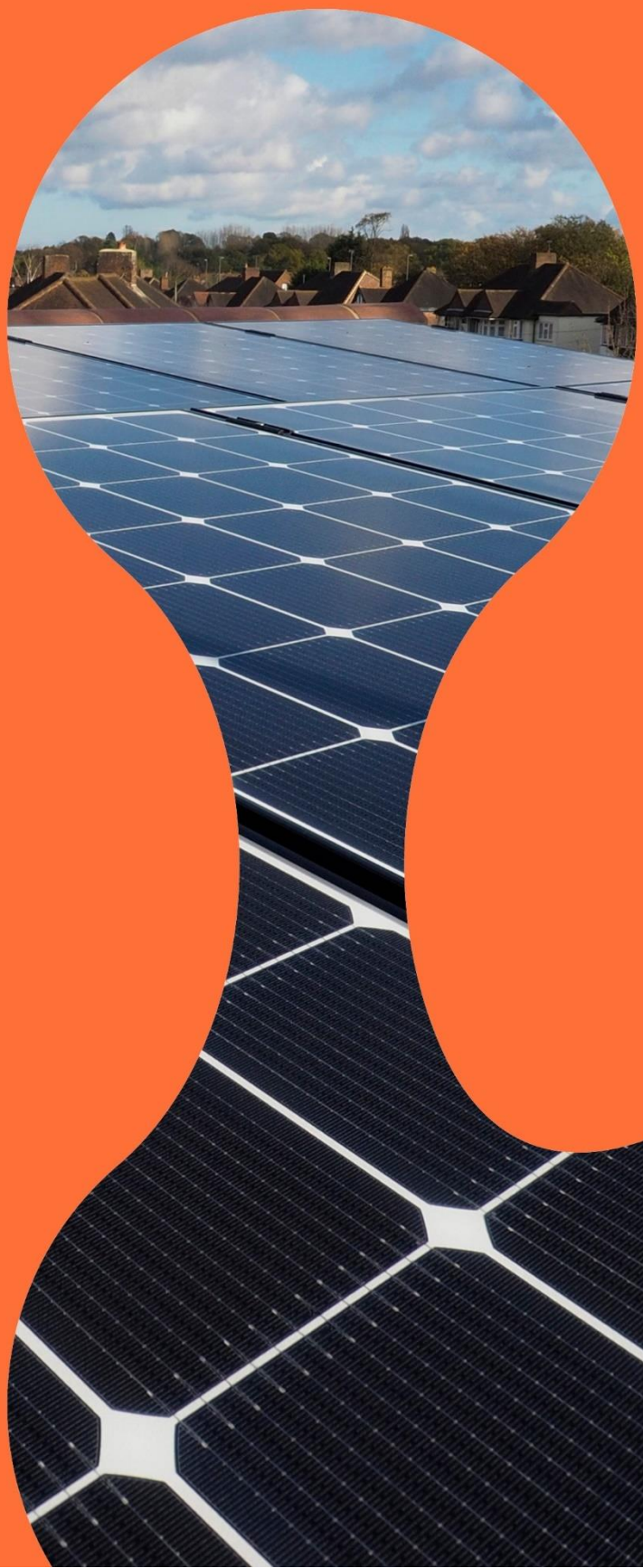
# A Summative Assessment of the ERDF Funded Retrofit Accelerator - Homes Programme

**A Final Report** for The Mayor of London, December 2023



# CONTENTS

# EXECUTIVE SUMMARY

## The Mayor of London's Retrofit-Accelerator for Homes Innovation (RA-H) was co-funded by the ERDF and Greater London Authority. This is an executive summary of the findings of an independent summative assessment undertaken to review the pilot programme's implementation.

This Summative Assessment reviews the progress made by RA-H in meeting its objectives, assesses the delivery model, and identifies successes, added value, lessons and areas for improvement. The summative assessment used a combination of desk research, in-depth qualitative interviews with stakeholders and a review of the wider economic impacts and programme performance, including assessing the effectiveness of the Innovation Partnership, Collaboration Hub and Capability Building workstreams.

This Summative Assessment builds upon the interim review findings and recommendations, produced in February 2022 which presented lessons learned and recommendations around contracts, legal and planning issues, as well as the best way to support HPs and SPs.

### OVERVIEW

The Retrofit Accelerator for Homes (RA-H) began in 2018 and provides technical advice and support to housing providers (HPs) for deep retrofitting of properties (energy efficiency upgrades of the whole house including building fabric). Originally due to end in July 2022, RA-H received an extension to continue approving projects and signing off funding through to 14th July 2023. Some of the projects are still in-progress or in the design stage at the time of writing in January 2024.

The purpose of the RA-H was to provide an innovative procurement mechanism for the design and delivery of deep retrofits via collaboration between HPs and solution providers (SPs). RA-H is supporting eight HPs, to complete a current pipeline of 61 deep retrofits against an ERDF target of 65 by the end of the ERDF-funded programme, albeit this was exceeded not long after the ERDF deadline. There are four SPs collaborating with the HPs.

The Innovation Partnership (IP) was established in 2020 as an innovation-focussed element of RA-H. Other elements included the Collaboration Hub, established in 2021, and the Capability Building workstream established in 2023 following the interim Summative Assessment of RA-H.

### CONTEXT

The Paris Agreement's long-term temperature goal is to keep the rise in global average temperature to well below 2°C (3.6°F) above pre-industrial levels, and to pursue efforts to limit the increase to 1.5°C (2.7°F). It outlined how this should be done by setting out a clear timetable on how countries should reduce greenhouse gas (GHG) emissions focusing upon net zero emissions by the second half of the 21st century. The UK Government and GLA have responded with their own policy ambitions and actions.

The ONS states that households are currently one of the largest contributors to UK greenhouse gas emissions, although GHG emissions have fallen by only 6% since 1990. Consumer expenditure (primarily heating homes and travelling) rose to 135 million tonnes (Mt)$CO_2e$ in 2021, accounting for 26% of total emissions. Market failures and other barriers to improving domestic energy efficiency in the capital has

resulted in less investment in London compared to the rest of the UK. This has resulted in a quarter of London's homes having energy ratings of E, F or G.

London made good progress in reducing its emissions. Between 2000 and 2018, London achieved a 58% reduction in workplace GHG emissions, a 40% reduction in emissions from homes, and a 7% reduction in emissions from transport. For the last four years, London has been rated "A" by Carbon Disclosure Project (CDP) on environmental transparency and action. In 2021, the Mayor was elected as the global chair of C40 cities, a global network of almost 100 megacities committed to achieving the 1.5°C target and collectively halving emissions by 2030.

The Mayor of London issued an updated Net Zero 2030 Pathway in January 2022 urging an acceleration in the pace of change to realise the 2030 ambition. The Accelerated Green Pathway estimates the need for nearly a 40% reduction in the total heat demand of our buildings, requiring over 200,000 homes to be retrofitted each year; 2.2 million heat pumps in operation in London by 2030; and a 27% reduction in car vehicle km travelled by 2030. Decarbonising heat is the single biggest challenge to getting these emissions down to zero. Virtually all homes will need some level of retrofitting over the next decade in order to meet the Mayor's net zero ambition.

The impact of Covid-19 and the cost-of-living crisis is a perfect storm hitting the UK's poorest individuals the hardest. DESNZ reported in February 2023 that by the end of 2023 13.4% of all UK households (3.26 million) were in fuel poverty.[1] The rate in London is almost identical to the UK average, at 13.2% of London households. The analysis does show that London has the smallest 'fuel poverty gap' - £232 - which measures the reduction in bills that the average fuel poor household needs in order to not be classed as fuel poor. The fuel poverty gap is strongly influenced by house size (floorspace) and energy efficiency and is narrower in urban areas. London sees some of the smallest house sizes and highest median energy efficiency ratings than other Englis regions. Nationally, 47% of all low-income households live in a property with a fuel poverty energy efficiency rating of band d or lower, providing a socio-economic imperative for deep retrofit.

Whole-house retrofit solutions exist and have potential to make a large contribution to decarbonisation of the UK's, and London's, housing stock. However, this potential will not be realised unless the cost of whole-house retrofit reduces to a level which is affordable for property owners. RA-H was designed to develop the whole-house retrofit supply chain and stimulate the market to help lower the cost.

## DELIVERY AND MANAGEMENT

### RATIONALE

Both internal and external stakeholders had a good understanding of the Programme's rationale and the importance of the approaches and activities delivered.

Reducing greenhouse gas emissions from housing and contributing to efforts to mitigate climate change were regarded as the primary objectives. RA-H was also seen as an attempt to drive innovation and aggregate demand to develop deep retrofit technologies, expertise, and skills whilst deploying offsite manufacturing processes to reduce costs and minimise resident disruption. RA-H was also regarded as a potentially strong means for lifting people out of fuel poverty.

### EXTERNAL CHALLENGES

External pressures and unfavourable economic conditions have had a substantial impact on the outcomes of the Programme. Key external challenges were:

[1] Department for Energy Security and Net Zero (2023). 'Annual Fuel Poverty Statistics 2023'. Available here.

- RA-H has been impacted by unprecedented supply chain inflation and shortages due to the global economy recovering from Covid-19, shocks like the war in Ukraine, and in the UK, adjustment to Brexit.
- Short programme timescales influenced delivery. The project extension was welcome, however SPs still faced pressures to deliver quickly, reducing the appetite to use more innovative approaches which RA-H was aiming to facilitate.
- Local authorities and housing providers focus upon statutory responsibilities means retrofit activity is not prioritised.
- A lack of long-term guaranteed funding sources makes housing providers unwilling to commit to the pipeline of work that the market needs to de-risk capital investment.
- The market/supply chain is much more developed for partial retrofit measures, making the case for whole house retrofit very challenging.

## RESIDENT EXPERIENCES/PERSPECTIVES

Resident feedback has centred on four key areas:

### COMMUNICATION

Residents highlighted the importance of clear and regular communication at each stage of the retrofitting process. For residents who had a positive experience having a central point of contact to field, and respond to, concerns or questions was very important. In boroughs where residents have had more negative experiences communication has been cited as a significant issue, with residents stating that it had been limited and unclear. These residents reported that it was particularly difficult to get one individual who could guarantee the efficient and satisfactory resolution of difficulties.

### EXPECTATION MANAGEMENT

Residents who had a positive experience of the deep retrofitting process had been given clear early information about the process and projected timeline which helped manage their expectations. In positive cases the level of disruption was explained clearly and openly to residents before signing up and they reported that the eventual benefits outweighed the issues caused.

In negative cases residents felt that they had been misled about the level of disruption. This has had an adverse impact upon resident relationships with residents expressing significant frustration when work was not completed to the timescales or standard that they believed had been initially outlined.

Residents in completed properties were slightly unsure if their energy bills had reduced but reflected that it was difficult to tell due to the rising energy costs.

Despite being unsure if energy costs had gone down, all residents were clear that their homes were far warmer and more comfortable to live in with other unexpected benefits such as reduced noise pollution experienced.

### TIMELINESS

Residents who had a positive experience of having their homes retrofitted reported the works taking three to six months. Whilst there were some delays the residents were kept updated through good communication which managed their expectations.

For residents who have had negative experiences timescales have been one of their most significant complaints. They reported very high levels of frustration about extensive and expanding timescales, which they state are much longer than they were originally told. They state that this frustration has been compounded by the lack of definitive schedule of work with a clear completion date.

## KEEPING THE RESIDENT AT THE CENTRE OF THE PROCESS

Key to a positive experience was keeping the resident at the heart of the process and a recognition they were opening their homes to strangers and exposing themselves to a complex set of ongoing variables and risks.

The most positive feedback came from residents who felt that contractors and HPs understood the impact of the work upon them and who worked closely with them to mitigate impact.

The most negative feedback came from residents who believed that the impact on them had not been properly considered and that this was compounded by 'rude' and 'disrespectful' contractors. Considerations made to the residents living within the properties whilst work was completed made a large difference to their overall satisfaction rates.

Residents in completed properties spoke positively of the support they had received to adjust to living in their new retrofitted homes. They spoke of unexpected benefits such as improved aesthetics, reduced noise pollution and their homes staying cool in summer. These were welcomed by the residents as additional benefits. They agreed that the benefits of the work outweighed the disruption they had incurred.

## STRENGTHS AND SUCCESSES

There have been areas of strength and success, particularly around the establishment of the Innovation Partnership and Collaboration Hub, the number of HPs and local authorities involved, and the Capability Building Workstream.

Headline strengths and successes were:

- The GLA provided added value by driving the culture of knowledge exchange and peer learning across London, which is something HPs would normally struggle to implement themselves.
- There has been some clear collaborative partnership work, particularly at the start of the Programme.
- The Collaboration Hub has facilitated knowledge sharing and peer support.
- Nine housing providers were successfully recruited to the scheme.
- The Capability Workstream has been well received by participants.
- 61 whole house net zero retrofits (ERDF definition) have been undertaken showing that it is possible.
- The Innovation Partnership was regarded by many stakeholders as vital to the delivery of the 61 retrofitted properties.
- Residents living within completed properties report clear benefits including reduced noise pollution, warmer homes, improved aesthetics, and reduced energy bills. They stated that the long-term benefits outweigh the disruption caused during improvement works.
- There is some evidence of an emerging retrofit supply chain, especially for specific components of retrofit. This demonstrates increased scope for using some elements of whole-house retrofit moving forward, for example panelised solutions and energy pods.

## PROGRAMME CHALLENGES

In numerical terms, performance against ERDF outputs has been positive. However, attempting to deliver an innovation project in the face of external challenges and a hard ERDF funding deadline created difficulties, sometimes exacerbated by a lack of genuine collaboration between parties to collectively solve shared challenges.

The most important challenge is that delivery and completion have been characterised by delays and increased costs for some projects. In these projects this has caused significant disruption to the lives of residents, has placed financial pressures on HPs and damaged relationships with SPs.

Other challenges are indicative of the innovative nature of the programme and a very challenging macro-economic context, and include:

- Re-designs have also seen a focus upon cheaper more easily procured solutions rather than the original ESUK solutions.
- The Collaboration Hub was not an effective forum for resolving some significant operational difficulties,
- The project management structures came under pressure in the face of challenges. Consistent tracking of critical success factors and KPIs at every stage of projects from design to completion may have flagged risks earlier, allowing collaborative action to be taken, before risks turned into major problems.
- The delayed contract process put increased pressure on an already shortened design phase.
- Delivery challenges have created cross organisational tensions.
- Incomplete and incorrect housing data in some projects made delivery challenging.
- Inflationary pressures have seen costs significantly increased and created substantial challenges for the business model.
- The development of the whole house offsite construction market has been minimal.
- Contractual discussions remained a significant issue throughout the Programme, due to the difficulties of creating contracts which share the risks of innovation between different parties without disincentivising commercial investment.

## PROGRAMME IMPROVEMENTS

Stakeholders were very keen to stress their ongoing commitment toward deep retrofit solutions, reaffirming their commitment to decarbonising the social housing stock and tackling fuel poverty. There was an acknowledgement that efforts to develop the offsite supply chain had not achieved the growth desired and that many projects had encountered significant issues. In response to these difficulties, stakeholders and beneficiaries did identify a number of potential improvements needed for the future.

Improving the quality of housing data needs to be a housing provider priority, this will help to develop multiple design processes for a wide range of archetypes.

Improvements need to prioritise reducing resident disruption.

Significant efficiencies could be gained from the use of smart digital technologies.

More contingency funding and time built into the programme to protect HPs and SPs against financial risks.

Ensure that the Collaboration Hub has enough capacity and scope built into its agenda to tackle operational challenges when they arise.

More early-stage work to engage with SPs to co-design an innovation project delivery model which aims to better share and reduce risk across all parties.

Continued improvements in housing provider capacity and expertise will allow outside support to be focused upon the most challenging technical aspects of design & delivery.

Emphasise the fuel poverty benefits of the Comfort Plan with references made to the positive feedback from resident's living in completed homes.

Retrofit improvements need to be seen within a holistic package of social housing improvements rather than measures that only come after statutory responsibilities.

## PERFORMANCE AND IMPACT

### EXPENDITURE PERFORMANCE

The initial GLA funding contributions are outlined below as per the ERDF funding agreement. Data shows that at the time of evaluation 100% of the allocated funding had been spent. Issues with defrayal meant that although the budget was spent during the claim period, £387,970 wasn't defrayed in the claim period and therefore £193,985 of ERDF match-funding couldn't be claimed.

#### RA-H Expenditure

| Expenditure | Original Funding Agreement (£) | Current Funding Agreement (£) | Amount | % of Target |
|---|---|---|---|---|
| Total ERDF Expenditure | £2,192,197 | £1,584,275 | £1,584,275 | |
| Total Match Funding (£m) | £2,192,196 | £2,977,776 | £2,977,776 | |
| Total Expenditure | £4,384,393 | £4,562,000 | £4,562,000 | 100% |
| Total Claimed | | | £4,174,030 | 91.4% |

### PERFORMANCE AGAINST ERDF OUTPUTS

The GLA had two contractual ERDF outputs. The table in Section 4.2 outlines outputs achieved against targets as based on the most recent project management data. The Programme has made good progress in both output areas:

- 61 households had completed whole-house retrofit (ERDF definition). This was 94% of the Programme's target of 65 households.
- 143.2 tonnes of greenhouse gas emissions (GHG) reductions were estimated to be achieved, 89% of the Programme's target of 161 tonnes.

Most of the whole house retrofits were completed within Sutton (13), followed by Enfield (10) Barking & Dagenham (3) and Kensington & Chelsea (2). Combined, the whole-house retrofits led to GHG emissions reduction of 143 $tCO_2e$.

### VALUE FOR MONEY

Escalating costs have meant HPs have had to spend more on delivery of the works supported by RA-H than planned, the full amount of which is not clear at the time of writing. Similarly, delivery partners have indicated that the Programme has cost them more than originally budgeted for. Considering this, and given the programme was primarily piloting innovation rather than aim to create direct economic impact, it is not appropriate to undertake an economic impact assessment.

In terms of carbon emissions, RA-H has claimed a reduction of 143.2tCO2e. With a planned programme cost of £4,174,030 this equates to a spend of £29,148 per tCO2e of saved.

The programme cost does not capture significant spend by some HPs to complete delayed projects and resolve resident disruption, estimated to be up to £1m by one HP. Combined with a lack of demonstrable per-property cost reductions to deliver whole-house retrofit at this early stage of the innovation process given delivery didn't move to stage three during RA-H's delivery, this raises questions about the viability of the current RA-H business model which are being assessed beyond the timeframe for delivery of the ERDF funded project.

## LESSONS AND FUTURE CONSIDERATIONS

Lessons that emerged from the evaluation are broken down by lessons for programme design, programme delivery, and programme design in keeping with ERDF requirements with additional considerations for the GLA.

### LESSONS FOR THOSE DESIGNING SIMILAR PROGRAMMES

Perhaps the most important lesson is the challenge of designing an innovation project which uses occupied homes rather than a test-bed environment. Typically, successful innovation programmes de-risk the innovation process for stakeholders and beneficiaries as far as possible. This was not necessarily possible with RA-H. This is primarily due to the fact that it involves real homes lived in by residents. For example, industrial innovation programmes often provide access to digital or physical twins of commercial processes in an R&D setting, where new technologies can be tested and iterated until they are proven to be technologically and commercially viable. Large transport and engineering innovation projects tend to use a test-bed environment with few real-world end users to prove technological and commercial viability. In both examples, finding out that things fail and trying other solutions is a key part of the innovation process. Using lived-in homes as the test-bed creates a new area of risk – residents – which innovation projects would generally not face, and finding out that things fail is not acceptable when it impacts on the liveability and safety of peoples' homes.

Other lessons raised from the evaluation are:

Tracking critical success factors (CSF) and KPIs can be made more robust and consistent to help manage risk and change. A process is required where all parties report risks and cost increases as they happen and take pre-agreed actions based on pre-agreed responsibilities. Key to this is ensuring work does not start on a house until all elements of whole-house retrofit are in-place and sequenced. For example, if a project dashboard identifies a supply chain risk to certain retrofit components, then actions may include pausing delivery whilst identifying an alternative source or rescoping to use different innovative solutions. This in turn would trigger a review of financial implications and a communication to HPs and residents. The fact that some projects started without SPs having accurate survey information about the houses (in one case not knowing how many bathrooms there were) or faced supply chain delays after construction started suggests a lack of effective monitoring of the right CSFs and KPIs.

Timelines dictated projects rather than project requirements. Some SPs have reported that programme timelines were restrictive, with a feeling of being pressured during the design stage to provide costs and innovation specifications too quickly. This led to a focus on starting projects too early to the detriment of vitally important processes. Part of this was driven by a sense that outputs needed to be delivered within the ERDF funding period. The GLA have been flexible in this regard, with delivery still ongoing with technical support being funded by the GLA after ERDF funding has ended, and the GLA facing a

financial penalty given it hasn't fully met the ERDF targets. However external funding for the capital element of the works was also an issue for housing providers.

**Capability building was a success but does not address capacity constraints**. Beneficiaries valued the capability support and the advice it provided. However, some of the recommendations could not be implemented due to a lack of capacity and supporting funding.

### DELIVERY LESSONS

**Starting work on site before all sufficient components have been supplied or manufactured increases risk**: Some of the longest delays occurred where contractors found unexpected structural conditions in properties, or when supply chain delays meant works could not be progressed. Taking more time to survey properties, scope and design the projects, and then delaying delivery until all components were available would have minimised time on site and resident disruption.

**A single initial point of contact between RA-H and HPs would be beneficial:** Some HPs were part of a RA-H retrofit project and the Capability Workstream, which meant they had different points of contact from the delivery partner. In one instance, a Local Authority officer taking part in the Capability Workstream knew that Turner & Townsend were working with colleagues on a housing project but did not know both activities were part of RA-H.

**A more dedicated and committed approach to collaboration** would help HPs and SPs work together to overcome shared challenges. This needs consistent attendance from those involved and should take a challenge-based approach. This means that the Collaboration Hub agenda is set by the main challenges projects are facing, and meetings end with clear actions and follow-ups resulting from discussions on how to solve challenges. Some issues may need a sub-group to work together more closely and frequently.

**A frank and honest initial conversation with residents about timescales and potential difficulties before work starts** would minimise resident dissatisfaction. Albeit this was complicated by the fact that, as an innovation project, the SPs had not correctly assessed the amount of time it would take to deliver, which incorrectly set expectations with HPs and residents. Resident visits to the improved housing stock would help them to conceptualise the scale of the improvements and to help shape their expectations.

**Digital tools and AI can provide efficiency and scalability**: Some local authorities conducting retrofit activities outside RA-H cited potential significant savings from the use of smart technologies/AI during the surveying processes.

### LESSONS FOR POLICY MAKERS

**Funding.** Market development and investment requires pipeline and demand certainty. In turn, housing providers and local authorities require long-term funding guarantees to mitigate their risk. Local authorities are not always able to submit bids to funding pots like SHDF before application cycle deadlines close and the amount of funding available is insufficient for the scale of work required. It also often comes with inflexible criteria and outputs which limits the number of projects being brought forward.

**Mixed methods will be important for the future of home retrofit**: Whole-house retrofit is only one solution for reducing GHG emissions from homes. In some cases a low number of whole house retrofit projects may be best, and in others a higher number of partial retrofits may be best, depending on cost and the nature of the homes in question.

**Public perception of retrofit may necessitate a different approach**: Low take up of national schemes to support retrofit (e.g. Green Homes Grant) and the experience of signing residents up to RA-H projects suggests that residents are reluctant to start retrofit on their homes. HPs could take a different approach by including retrofit work as part of ongoing renovations (e.g. new kitchens and bathrooms) rather than as stand-alone activities.

**Dedicated innovation support is needed before whole house retrofit is proven to be commercially viable and able to deliver at pace and scale:** Whole house and the Energiesprong approach will continue to be part of the wider retrofit menu/set of options. However more innovation support, supply chain building and market development is needed to bridge the gap from pilot to a viable mainstream solution.

**Innovation can be slow:** supporting innovation is clearly key to enabling a better, quicker, more cost-effective and technically appropriate approach to delivery. However this can be a slow, complex and iterative process. Whilst support is needed to help those who are trying to innovate – and support can be needed across a range of disciplines and elements of the work, it also needs to be provided on a longer-term basis to maximise impacts.

## CONSIDERATIONS FOR THE FUTURE

Viewed purely as a pilot of full house retrofit RA-H has achieved what it set out to do. RA-H also performed well against ERDF output targets. Successful projects are motivating HPs to pursue funding for future deep whole house retrofit activity. Residents' energy bills have been reduced by an estimated £1,249 per year helping to address fuel poverty whilst reducing carbon emissions.

However, some schemes had to proceed with higher costs and/or delays, often whilst redesigns were carried out to ensure that the original specification could be kept. Some beneficiaries had to significantly increase their level of match funding to complete projects, which is not a sustainable finance model. Some projects have also seen large levels of resident dissatisfaction during the project due to disruption. Resident expectations were not always met, and in some instances, residents were told projects would last days and they have not been completed for months. The fact that benefits to residents will only be felt in the middle-to-long-term future in the form of lower bills and better standards of living, whilst disruption is immediate makes communicating whole-house retrofit challenging.

Aside from progress towards ERDF output targets, objectives to drive a reduction in whole house retrofit costs, develop the supply chain, and achieve efficiencies of scale have not been seen as hoped during the ERDF-funded programme period. However, delivery is continuing beyond this period, production of panels is increasing in London (e.g. investment in Barking & Dagenham) and there are indications that SPs such as Equans are committing to higher volumes of ESUK retrofits around the UK. Similarly, RA-H has yet to prove a sustainable long-term business model to make whole-house retrofit viable for HPs providers and large numbers of homes. Evidence from the ongoing delivery RA-H will need to be reviewed before assessing whether Stages Three and Four will be feasible.

The need to reach London's net zero target is as imperative and decarbonising homes at pace and scale remains important. However, the financial risks to HPs and Local Authorities and the risk of disruption residents remain a challenge for whole house retrofit given current market conditions. Consideration should be given to whether innovation projects like RA-H are feasible. Alternatives could be less resource intensive support to help HPs access funding and finance such as SHDF and the Mayor of London's Green Finance Fund. HPs who are keen to continue with whole house retrofit can then do so.

# 1 INTRODUCTION AND PROGRAMME CONTEXT

This report is an ERDF Summative Assessment of the Retrofit Accelerator for Homes (RA-H). This chapter introduces the aims, objectives, and activities of the RA-H Programme and summarises the evaluation approach.

Subsequent chapters set out the wider policy context of RA-H (Chapter 2) and reviews the delivery model and views from key stakeholders (Chapter 3), assess the performance and impact of RA-H (Chapter 4). The Summative Assessment concludes with lessons and recommendations (Chapter 5). This report is a follow up to the first Summative Assessment Report produced in February 2022.

## 1.1 PROGRAMME SUMMARY

The Retrofit Accelerator for Homes (RA-H) began in 2018 and provides technical advice and support to housing providers (HPs) for deep retrofitting of properties (energy efficiency upgrades of the whole house including building fabric). The Innovation Partnership (IP) was established in 2020 as a fundamental element of RA-H. Originally due to end in July 2022, RA-H received an extension to continue approving projects and signing off funding to through to 14th July 2023. Some of the projects are still in-progress or in the design stage at the time of writing in December 2023.

RA-H and the IP were regarded by the GLA as the first steps towards developing a deep retrofit market across the capital. They also saw it as an opportunity to showcase the potential of the Energiesprong UK approach whilst providing tangible examples of how decarbonisation can be achieved in social housing.

RA-H supported nine housing providers (two outside London) to deliver 61 retrofits (ERDF target) by the end of the Programme. There are four partners within the IP (Turner and Townsend, Energiesprong UK, the Carbon Trust, and PA Consulting) collaborating with eight London housing providers[2] to deliver the deep retrofits. The IP continues until 2024 to support the delivery of the contracted retrofits which has exceeded GLA targets.

The GLA was instrumental in establishing the IP. However, as the lead IP partner and leader of the Programme Delivery Unit, T&T had responsibility for overseeing the delivery of the RA-H programme. The GLA were responsible for strategic decisions, oversight and governance, promotion & publicity and working with external organisations. In their role as delivery lead, T&T have provided ongoing project management support to housing providers through dedicated Retrofit Delivery Managers, an engagement team, and the Collaboration Hub activities.

They also identified and analysed procurement and innovation options settling on the Energiesprong UK approach delivered with IP support. T&T engaged potential housing and solution providers, managing the solution provider panel selection process. They have also helped to identify and apply for retrofit funding schemes, supported a successful aggregated bid for £11.5m of Social Housing Decarbonisation Funding[3] for several housing providers including LB Barking and Dagenham, LB Ealing, LB Haringey, LB Lambeth, LB Hammersmith & Fulham, LB Enfield.

A range of technical support has been provided by Retrofit Delivery Managers (RDMs) helping with the identification of appropriate properties, contract management to planning. The RDMs have regular

[2] LB Camden joined in early 2023

[3] Involving eight London based housing providers (LB Barking and Dagenham, LB Ealing, LB Haringey, LB Lambeth, LB Hammersmith & Fulham and LB Enfield)

meetings with each housing & solution providers and the GLA in a variety of different forums. T&T also have responsibility for monthly and fortnightly reporting of performance against KPIs, current and forecast, workstream activities, managing risks and issues, and the completion of timesheets.

They also paired housing providers with a solution provider with Innovation Partnership contracts signed in late 2021. Following contract signing design work began in early 2022.

## INNOVATION PARTNERSHIP

The IP was set up to address the challenges for the retrofit market including finance, cost, demand, scale, and performance. Running until 2024 the objective was to establish an innovative procurement mechanism for the design and delivery of deep retrofits via collaboration between housing and solution providers. The IP aimed to develop new, cost-effective, high quality retrofit solutions to be used at first for the HPs within RA-H but with a vision for this to disseminate these across the market, driving down costs down and building demand in the supply chain.

It followed four clear stages:

- Stage One: Designing the solutions with the design fee paid for by the HPs. It was estimated this stage would take four months.
- Stage Two: Prototype of homes by delivering a limited number of deep retrofitted properties. It was estimated this stage would take four months. The SPs paid for the prototype stage.
- Stage Three: Piloting the homes by upscaling the delivery of retrofitted properties. The SPs will pay for the pilot stage. It is estimated this stage will take five months.
- Stage Four: Commercialisation of deep retrofit solutions by delivering to a significant number of properties to achieve 'economic price point'. It is estimated this stage will take 17 months and the SPs will be paid for this work.

The IP partners were supported by the creation of a Collaboration Hub designed to help foster collaboration and innovation ideas. It facilitates regular meetings with partners, organises events and study trips and builds links with manufacturers.

## ENERGIESPRONG UK

The RA-H Programme trialled the first use of Energiesprong's (ES) approach (including their Comfort Plan) within the UK (ESUK). The ESUK approach has potential to cut annual energy use by a third, providing residents with a guarantee of 21ºc heat, 124 litres of hot water, and 2300kWh annual plug power. The Comfort Plan is an agreed cost charged to residents in return for these guarantees which is used to partially finance retrofit programmes such as RA-H. The Comfort Plan is untested in the UK, it has been used in Europe, and is a consumer agreement alongside the tenancy.

It was intended that the ESUK approach would help develop the retrofit market resulting in reduced cost of retrofit solutions. Under ES, retrofit solutions would be largely manufactured offsite which would allow for production at scale, lowering the cost and limiting the amount of time spent on-site. The ESUK approach anticipated ten days on-site. This is with a view of causing significantly less disruption to residents than conventional construction approaches. It also aimed to create both scalability and flexibility within the supply chain so that the approach could be undertaken on a wider range of different housing architypes.

## WORKSTREAMS

The main activities fell under four Workstreams.

### Workstream 1: Technical assistance for deep retrofit

This delivery model aimed to work with London local authorities and housing associations to deliver innovative approaches to retrofit projects. In order to achieve deep retrofit and improve the carbon savings per household a specialist team would be brought in to enable projects to be identified and implemented successfully.

### Workstream 2: Unlocking finance funding

Funders were set to identify a range of existing funding opportunities, and how they could be better utilised in deep retrofit projects. Including aggregating projects and funding opportunities together to improve investment by increasing investor confidence and achieving economies of scale. This was to be carried out across multiple sub-regions to create larger scale opportunities to attract private and social finance.

### Workstream 3: Supporting the roll out of innovative delivery mechanisms

RA-H aimed to address harder to treat energy efficiency retrofits, using new delivery mechanisms. The two focuses were on brokering procurement deals to achieve economies of scale and making retrofit more affordable and achievable.

### Workstream 4: Piloting area based retrofit schemes

RA-H planned to develop an assistance package for retrofit in mixed-tenure areas. This approach recognised the lack of homogeneity across London and would address local needs directly. Utilising revolving loans and incentive schemes for private landlords and owner-occupiers who may block works by social landlords. Following the interim review and the Programme extension this Workstream was replaced in year four of the Programme by the fifth Workstream, described below.

### Workstream 5: Capacity Building

This final stream set out to provide group support to London's social housing providers (SHP) to improve their capacity to deliver retrofit projects. This workstream was split into four phases. Phase one planned to work with four councils and one housing association, briefing them on the work and running workshops. Bespoke reports were then produced. Phases two and three involved interviews with 12 housing providers to develop an audit of their capability maturity.

Following this action, planning workshops were then held to help identify the next steps for the Capability Reports, including their maturity matrix and a bespoke roadmap. Further workshops provided feedback and identified areas where further support was required. The 12 organisations received reports including a capability assessment and action plan. In the final phase four technical training will be provided to support their resident engagement and business case building activities.

There addition of this Workstream was a recognition that significant further work was required to ensure that housing providers had the capability and capacity to develop the scale and pace of retrofit activity required by the Accelerated Green Pathway.

## 1.2 AIMS, RATIONALE AND MARKET FAILURES

The RA-H logic model (see diagram at the end of this chapter) illustrates the connection between planned activities, inputs and intended results (outcomes and impacts). It also summarises the Programme's objectives, rationale and market failure being addressed.

RA-H aimed to generate and accelerate substantial home energy efficiency retrofit activity across London. RA-H addresses national and sub-national strategic objectives (as defined in the ERDF call for proposals) including prioritising the need to move towards a low carbon economy, supporting innovation and helping to develop market demand for low carbon and environmental goods and services and in turn stimulate supply chain growth.

Specifically, to achieve this, the main objectives of the Programme were to:

- Reduce carbon emissions and mitigate climate change by reducing energy demand.
- Increase the pipeline of deep retrofit activity, reduce costs and create the efficiencies required for scaling up to thousands of properties.
- Reduce fuel poverty, excess winter deaths, and illness through warmer and more affordable housing.
- Create and sustain skilled jobs in the retrofit market, promote and normalise innovative methods and sustainable finance models.
- Assist efforts to develop the expertise, capacity, and capability required to deliver deep retrofit within social housing.
- Tackle planning and financial barriers and create multi-stakeholder approaches to facilitating a further roll out of high quality deep retrofit activity.

## MARKET FAILURES

RA-H was based on a recognition that whilst there is significant potential for cost-effective investment in energy efficiency in London, it is not currently being fully realised. The ONS states that households are currently one of the largest contributors to UK greenhouse gas emissions, having fallen by only 6% since 1990. Consumer expenditure (primarily heating homes and travelling) rose to 135 million tones (Mt)$CO_2e$ in 2021, accounting for 26% of total emissions. Market failures and other barriers to improving domestic energy efficiency in the capital has resulted in less investment in London compared to the rest of the UK. This has resulted in a quarter of London's homes having energy ratings of E, F or G.

These barriers include:

- A lack of capacity and expertise within housing providers to identify and implement deep retrofit projects.
- Difficulties accessing finance, caused by tight public sector budgets, and competing needs for spending. A lack of low-cost finance and long paybacks, with savings rarely guaranteed.
- An underdeveloped deep retrofit market. While there are examples of companies focused on helping domestic buildings improve energy efficiency, the market is limited.
- A lack of coherent, long-term, and sustainable retrofit UK Government funding.
- Misaligned and split incentives within the private rented sector with homeowners typically responsible for investment but tenants receiving the benefits of lower energy bills.
- The challenging nature of London's housing stock:
    - Flats make up 50% of London's housing stock – a complex ownership picture allied with a difficult regulatory and funding framework makes decarbonising flats difficult.

- Approximately 60% of London's properties are solid wall making insulation challenging and expensive.
- Half of England's conservation areas are in London, creating planning restrictions.

- The nature of deep retrofit activities, requiring changes to many areas of the house, can cause significant disruption to the lives of residents, which can produce push-back against these works occurring in their property.

### KEY PERFORMANCE INDICATORS

RA-H originally had four KPIs (table below). The first two KPIs were ERDF targets and the second two KPIs were GLA set targets. The KPI targets were increased following the extension to July 2023 (second table below). The final ERDF KPIs are a combination of both targets for the number of households receiving deep retrofit (65 homes) and estimated annual GHG reductions (saving in tonnes of CO2e) (161 t CO2e).

#### Original KPIs – Due for completion by July 2022

| KPI | Programme KPIs | Target |
|---|---|---|
| KPI 1 | ERDF - Number of homes receiving deep retrofit | 50 |
| KPI 2 | ERDF - Annual GHG reductions resulting from KPI 1 (saving in tonnes of $CO_2e$) | 124 |
| KPI 3 | Number of homes contracted[4] to receive deep retrofit | 1,678 |
| KPI 4 | Annual GHG reductions resulting from KPI 3 (saving in tonnes of $CO_2e$) | 4,161 |

#### Extension KPIs – Due for completion by July 2023

| KPI | Programme KPIs | Target |
|---|---|---|
| KPI 8 | ERDF – Number of homes receiving deep retrofit | 15 |
| KPI 9 | ERDF – Annual GHG reductions (saving in tonnes of $CO_2e$) | 37 |
| KPI 10 | Number of capability assessments completed | 12 |
| KPI 11 | Number of capability building workshops delivered | 8 |

## 1.3 EVALUATION SCOPE AND STUDY OBJECTIVES

This summative assessment builds upon the interim review findings and recommendations. In February 2022 Kada Research delivered an interim summative assessment of the RA-H Programme according to the original timetable. This ERDF compliant report included primary and secondary research methods, blending qualitative and quantitative approaches including client and stakeholder interviews and case studies.

At the time of the interim report 24% (£437,000) of the allocated funding had yet to be drawn down. Only 11 homes had received a deep retrofit with a further 66 planned (32% above the target). It was predicted that GHG reductions of 4,285 $tCO_2e$ per year would be achieved by Programme completion.

Whilst recognising that the pioneering and innovative nature of the Programme the Interim Report outlined a series of rigid and short-term structural issues that constrained the Programme. The timelines for completion of the Programme were inflexible, necessitated by the external funding requirements. The retrofit market is currently in its infancy, which restricted the options available for scale-up, these difficulties were exacerbated by the effects of Covid-19 and Brexit. The unique make-up of flat ownership in London adds challenges to decarbonising blocks of flats, as multiple different parties can have ownership stakes to different elements of the same building.

[4] Contracted to receive retrofit does not necessarily mean retrofit activity has been delivered.

It concluded with lessons learned from these challenges and recommendations around contracts, legal and planning issues, as well as the best way to support HPs and SPs

This included:

- To set out coherent guidance on housing standards and regulations, work with social housing providers and stakeholders, and provide an integrated view.
- To explore and support the financial vehicles, tools and amounts required to implement the housing retrofit and energy efficiency measures to meet its emissions targets.
- To establish a retrofit knowledge hub/one-stop-shop service.
- Aim to co-design future programmes with London local authorities and other key stakeholders which will produce strategic benefits and aid delivery.
- Continue to roll out the deep retrofit model in social housing.

This final summative assessment aims to provide an evidence-based evaluation, reviewing RA-H in its entirety (including part of the extension period). It builds upon the interim review findings and recommendations. It provides a full summative assessment in line with ERDF requirements of RA-H following the completion of all ERDF funded activity in June 2023.

The two key aims of this updated assessment are as follows:

I. To comprehensively evaluate the RA-H Programme against its original and extension KPIs, four of which align with ERDF objectives (C31 and C34)[5].
II. Assess the effectiveness of the Programme Delivery Unit (PDU), the Innovation Partnership and Collaboration Hub.

In addition to this the following have been reviewed:

I. The relevance and consistency of RA-H within the context of changes to policy or economic circumstances during its delivery period.
II. The economic impact attributable to RA-H, including both the intended and actual outcomes and impact.
III. The value for money and cost-effectiveness of RA-H
IV. Housing and retrofit market conditions prior to and during RA-H including an assessment of the market failures RA-H was designed to address and the extent it has done this.
V. The added value that came from the GLA leading the Programme, including its role in shaping, and responding to central government policy and other wider benefits.
VI. The effectiveness of the Innovation Partnership at supporting the creation of a substantial retrofit pipeline and market that can scale the development and delivery of cost efficient, net zero home retrofits.
VII. The effectiveness of the Collaboration Hub at supporting the Innovation Partnership and achieving tangible outcomes through collaboration.
VIII. The extent to which the Programme has supported equality, diversity and inclusion and minimised impacts.

[5] Linked to ERDF Investment Priority 4c: C31 is the number of households with improved energy consumption classification (50 households) and C34 is the estimated GHG reductions (124 tonnes of $CO_2e$).

# Retrofit Accelerator-Homes (RA-H): Logic Model Overview

## Objectives:

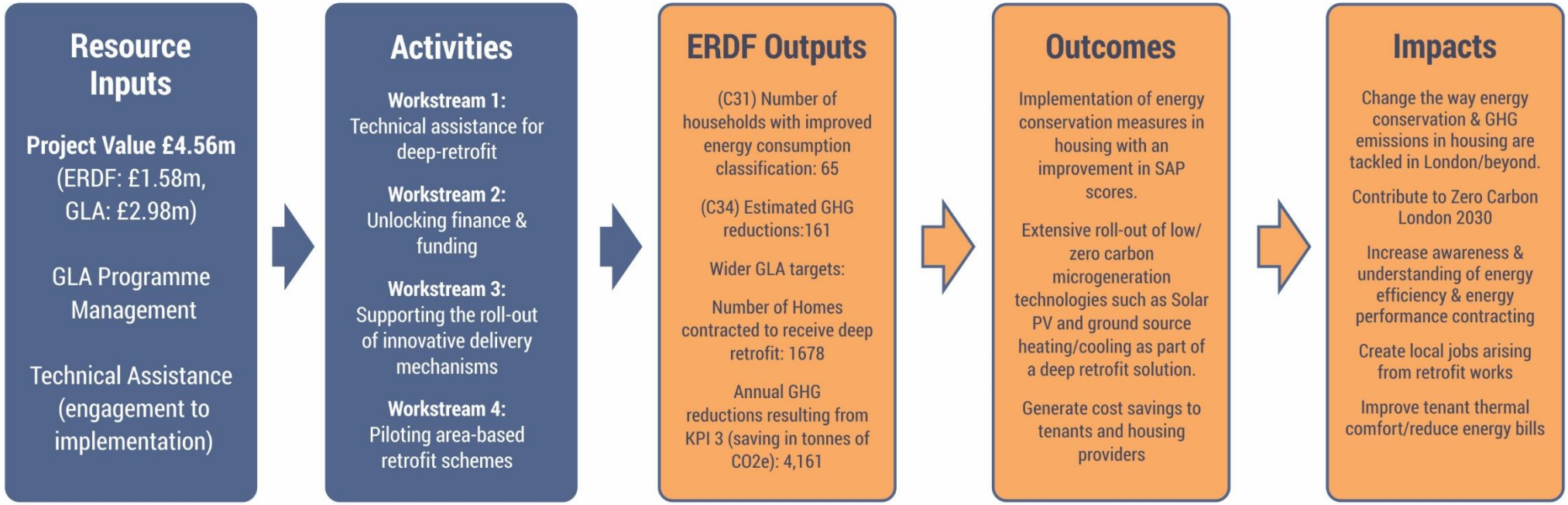
The project aims to generate and accelerate substantial retrofit activity across London, including: (a) reducing greenhouse gas (GHG) emissions from housing (b) delivering energy efficiency measures through deep retrofits to many homes and growing the market for many thousands more (c) cutting household energy bills, alleviating fuel poverty and helping to prevent excess winter deaths (d) sustaining/providing skilled jobs in the retrofit market and growing knowledge and expertise within supported organisations (e) increasing the quality of energy efficiency retrofit works.

## Rationale:

The need for retrofit remains high. A quarter of London's homes that have been given an Energy Performance Certificate since 2009, have energy ratings of E, F or G. Previous projects proved that barriers such as the lack of capacity and expertise in landlords can be overcome through tailored technical support but there is a clear need to deliver deeper retrofits - the focus of this project.

## Market Failure:

Specific barriers identified include a lack of: (a) capacity and expertise within HPs to identify and implement deep retrofit projects and access finance (b) a 'mainstream' developed market. (c) low-cost finance and long paybacks (d) a coherent and sustainable retrofit Government funding offer.



# 2 STRATEGIC CONTEXT

## This chapter sets out the national and regional economic and policy context to RA-H.

The Paris Agreement's long-term temperature goal is to keep the rise in global average temperature to well below 2°C (3.6°F) above pre-industrial levels, and to pursue efforts to limit the increase to 1.5°C (2.7°F). It outlined how this should be done by setting out a clear timetable on how countries should reduce emission focusing upon net zero emissions by the second half of the 21st century. The UK Government and GLA have responded with their own policy ambitions and actions.

### 2.1 NATIONAL CONTEXT

#### UK NET ZERO POLICY CONTEXT

As of 2018 UK homes were responsible for 16% of all emissions. The House of Common's Climate Change Committee (CCC) stated that the UK Government "will not meet their targets for emissions reduction without near complete decarbonisation of the housing stock"[6]. In December 2020, the CCC published its recommendations for the sixth carbon budget[7], and Government announced that it would target a 68% reduction in carbon emissions by 2030, as a new ambitious milestone to its 2050 net zero target. As of November 2021, 28 local authorities and the Mayor of London have passed 'climate emergency declarations'. Additionally, more than 300 local councils across the UK (to date) have declared a climate emergency, including the Local Government Association (LGA).

Evidence shows that households are currently one of the largest contributors to UK greenhouse gas emissions, although GHG emissions have fallen by only 6% since 1990. Consumer expenditure (primarily heating homes and travelling) rose to 135 million tonnes (Mt)CO2e in 2021, accounting for 26% of total emissions.

The then Department for Business, Energy, and Industrial Strategy (BEIS) unveiled the Social Housing Decarbonisation Fund (SHDF) Demonstrator in 2020, with £62m to deliver innovative retrofit projects in multiple waves of funding rounds. The Demonstrator operated across the UK, focusing on cost reduction, and reducing efficiency performance scores. BEIS then launched Wave 1 of the SHDF in March 2021. SHDF's main aim was to increase the number of houses with an Energy Performance Certificate (EPC) rating of C. It focused on lower complexity higher volume projects, targeting the worst performing properties first. This Fund supported registered social housing providers to install energy performance measures in social homes in England. Up to £17 million was awarded in this wave which ran until January 2023.

Wave 2.1 was unveiled in June 2022. This wave had a larger budget of £800 million but came with additional requirements from previous rounds. The requirements included: a minimum number of 100 homes at EPC band D-G; registered providers and charities could apply directly; there was a longer delivery window running till 2025; co-funding of 50% of the total costs was required; and cost caps depending on the type of pre-existing walls and the current EPC band. In November 2023 Wave 2.2 of the SHDF was released, this introduced more flexibility to the minimum number of properties per bid (the minimum remained 100 properties, but with an allowance where there was a good reason this number could not be met), although an additional requirement for the grant funding to be spent in the first year was also introduced.

[6] Committee on Climate Change (2019). 'UK Housing: Fit for the Future?'. Available here.
[7] The Climate Change Committee (2020). 'Sixth Carbon Budget'. Available here.

SHDF is designed to enable a high-volume of homes to reach EPC C through partial retrofit, rather than reaching net zero with deeper and whole-house retrofit. This means there is a gap in dedicated support to increase capacity and capability of the whole-house retrofit industry. RA-H was established to fill this gap.

### ECONOMIC CONTEXT

The Covid-19 pandemic impacted upon the delivery of the first stages RA-H as detailed in the previous report. It made collaboration less effective with all engagement moving online. This made it particularly challenging when trying to reach the most vulnerable residents. The impacts of the pandemic on the global supply chain also raised further issues for RA-H with increasing costs and lead times.

The UK is also continuing to face a crisis in the cost of living. UK inflation rose to 6.7%[8] in August 2023 – significantly above the long-term average. Prices across all areas of life from transport to food and energy have been rising since 2021, with energy prices increasing substantially due to geo-political events and increased global demand as countries recover from the Covid-19 pandemic.

The cumulative impact of these factors is a perfect storm hitting the UK's poorest individuals the hardest. DESNZ reported in February 2023 that by the end of 2023 13.4% of all UK households (3.26 million) were in fuel poverty.[9] The rate in London is almost identical to the UK average, at 13.2% of London households. The analysis does show that London has the smallest 'fuel poverty gap' - £232 - which measures the reduction in bills that the average fuel poor household needs in order to not be classed as fuel poor. The fuel poverty gap is strongly influenced by house size (floorspace) and energy efficiency and is narrower in urban areas. London sees some of the smallest house sizes and highest median energy efficiency ratings than other Englis regions. Nationally, 47% of all low-income households live in a property with a fuel poverty energy efficiency rating of band d or lower, providing a socio-economic imperative for deep retrofit.

## 2.2 LONDON CONTEXT

### LONDON'S POLICY RESPONSE, ASPIRATIONS AND TARGETS

In 2018, the Mayor of London, Sadiq Khan, published the London Environment Strategy and 1.5°C Climate Action Plan. These set out pathways, policies and actions needed to achieve a net zero London by 2050. Since then, the science has shown the need for even more urgent action and the stark consequences of failing to act. Recognising this urgency, in 2020 the Mayor declared a climate emergency for London and brought forward by 20 years the target for London to be net zero by 2030, whilst at the same time protecting the most disadvantaged Londoners by tackling fuel poverty. This was considered a stretching ambition given the scale of fuel poverty and the low take-up of energy efficiency measures at the time.

Since 2018, the GLA has implemented a range of programmes and policies to support the path to net zero. London goes beyond the national requirements for planning zero carbon homes and commercial buildings standards for new development and is the only major city in the UK to have done so. Policy has encouraged a shift towards increasing active travel and public transport usage, expanding the number of rapid charge points and electric buses, and widening the implementation of Ultra-Low Emission Zones (ULEZ). Access to funding such as the Mayor's Energy Efficiency Fund and the Green New Deal Fund has enabled heat network projects, and electric vehicle charging infrastructure and secured green jobs for Londoners. Retrofit Programmes and Renewable Energy Accelerators have also played major roles in London's path to net zero.

[8] ONS Consumer Prices Index

[9] Department for Energy Security and Net Zero (2023). 'Annual Fuel Poverty Statistics 2023'. Available here.

London has made good progress in reducing its emissions. Between 2000 and 2018, London achieved a 58% reduction in workplace greenhouse gas emissions, a 40% reduction in emissions from homes, and a 7% reduction in emissions from transport. For the last four years, London has been rated "A" by CDP on environmental transparency and action. In 2021, the Mayor was elected as the global chair of C40 cities, a global network of almost 100 megacities committed to achieving the 1.5°C target and collectively halving emissions by 2030.

## LONDON'S HOUSING AND CLIMATE CHANGE

The Mayor of London issued an updated Net Zero 2030 Pathway in January 2022 urging an acceleration in the pace of change to realise the 2030 ambition. The Accelerated Green Pathway estimates the need for nearly a 40% reduction in the total heat demand of our buildings, requiring over 200,000 homes to be retrofitted each year; 2.2 million heat pumps in operation in London by 2030; and a 27% reduction in car vehicle km travelled by 2030. Decarbonising heat is the single biggest challenge to getting these emissions down to zero. Virtually all homes will need some level of retrofitting over the next decade in order to meet the Mayor's net zero ambition.

These challenging ambitions paved the way for a range of energy efficiency projects to be drawn. These projects included RA-H. Other projects were part of the Action Plan which, to give an overview, focused on Warmer Homes, the development of London Power – a landmark fair-priced, green energy company available exclusively to Londoners, a Fuel Poverty Partnership, and a Solar Action Plan amongst others. Support included financial backing as well as technical expert assistance.

In July 2021, London Councils published the Retrofit London Housing Action Plan. This project is part of Programme #1 Retrofit London, as introduced in the December 2019 Joint Statement on Climate Change published by London Councils. The plan sets out several collaborative actions that can be taken forward in London along with further proposed metrics – including metrics on overall carbon emissions, heating demand and energy use – that can be adopted to ensure the average EPC B target is achieved.

## EUROPEAN STRUCTURAL INVESTMENT FRAMEWORK (ESIF) FOR LONDON

RA-H is funded under ESIF Priority Axis 4c "supporting energy efficiency, smart energy management and renewable energy use in public infrastructure including public buildings and in the housing sector". This Priority Axis encourages ERDF to be used for innovation-based technologies and demonstrator activities. A specific objective under this Axis is to "increase energy efficiency in homes and buildings including through the implementation of low carbon technologies". RA-H fits perfectly with the indicative measures suggested which include:

- The provision of advice and support to increase the use and take up of low carbon technologies, energy efficiency measures.
- Renewable energy technologies and smart energy systems in housing stock.
- Supporting low carbon innovation in relation to integrated 'whole place' energy management approach including energy waste and re-use.
- Investing in building retrofit, energy efficiency measures, renewable and smart energy systems deployment, especially whole building, or place solutions exemplifying next phase technologies which are near to market.
- Investing in domestic energy efficiency, renewable energy, and smart construction techniques.
- Investment in the development and wider use of Energy Performance Contracting in public buildings and housing sector.

The London Enterprise Panel's (LEP) ESIF and Sustainable Urban Development Strategy[10] had sustainable development as a key cross-cutting theme. There was a commitment to ensuring ESIF funds are focused on delivering a better quality of life for all Londoners including the quality of housing. ESIF investments had to take account of those Mayoral strategies which form the integrated framework for sustainable development. Individual projects had to support positive environmental impacts and reduce negative ones. The strategy included a specific environmental protection requirement for climate change and energy "*to mitigate the effects of climate change by reducing London's emission of greenhouse gases and adapting to its impact*".

[10] London Enterprise Panel, 2014-2020 European Structural and Investment Funds & Sustainable Urban Development Strategy for London, (2016). Available here.

# 3 DELIVERY AND MANAGEMENT

This section of the report explores the implementation of the Programme. Interviews with stakeholders and partners included discussions around the delivery and impact of the Programme. It reflects on progress made against objectives in the logic model and covers the strengths and challenges of the Programme.

This chapter is informed by feedback sought from engagement with a wide range of internal and external stakeholders.

## 3.1 RATIONALE

Key Messages:
- Stakeholders understood and were very supportive of the rationale for RA-H, seeing it as a vital element of tackling social housing carbon emissions and fuel poverty.

Both internal and external stakeholders had a good understanding of the Programme's rationale and the importance of the approaches and activities delivered.

Reducing greenhouse gas emissions from housing and contributing to efforts to mitigate climate change were regarded as the primary objectives. The Programme was seen as an attempt to drive innovation and develop deep retrofit technologies, expertise, and skills whilst deploying offsite manufacturing processes to reduce costs and minimise resident disruption. Stakeholders saw the ES approach as a means for creating a pipeline of future work where increased scale would find efficiencies and drive down costs. Through aggregated demand, this approach was seen to force market development and supply chain innovation, expertise and skills development.

Deep whole house retrofit, and the provision of a comfort guarantee were also widely regarded as a good means for lifting people out of fuel poverty. Some stakeholders believed that increased emphasis upon this element of the Programme was required when the Comfort Plan began to be questioned by local authorities concerned about the cost implications for residents.

## 3.2 EXTERNAL CHALLENGES

Key Messages:
- RA-H has been impacted by unprecedented supply chain inflation and shortages due to the global economy recovering from Covid-19, shocks like the war in Ukraine, and in the UK, adjustment to Brexit.
- Local authorities and housing providers focus upon statutory responsibilities means retrofit activity is not prioritised.
- A lack of long-term guaranteed funding sources makes housing providers unwilling to commit to the pipeline of work that the market needs to de-risk capital investment.
- The market/supply chain is much more developed for partial retrofit measures, make the case for whole house retrofit has proven to be very challenging.

Before reviewing the programme delivery model it is important to highlight the external and contextual challenges facing RA-H. External pressures and **unfavourable economic conditions have had a substantial impact on the outcomes of the Programme**, as discussed below.

**Programme and individual timescales have been adversely affected by planning delays**. Housing and Solution Providers have encountered a myriad of planning issues that have had a significant impact upon delivery timescales. As a whole house process that impacts upon both the interior and exterior of building the ES process has come into conflict with (seemingly unforeseen) planning restrictions in several local

authorities. Working with planning teams to formulate acceptable workarounds has significantly delayed the delivery of several projects.

RA-H has been impacted by supply chain inflation and shortages. This is due to the global economy recovering from Covid-19, shocks like the war in Ukraine, and in the UK, adjustment to Brexit. Inflation in the UK rose fastest at the time the retrofit projects were underway, reaching a peak of 11.1% in October 2022. The impact on the affordability of whole house retrofit is clear, especially given the lack of scale in the supply chain. At the start of the project a whole house retrofit was estimated to cost £80,000, but this has since increased by 64% to over £125,000 per house.

Across all projects solution providers had to rescope their plans leading to a substantial reduction in the number of homes achieving a deep retrofit.

The largest proportion of the local authorities' capital budget is focused upon statutory social housing obligations. Local authorities have several statutory responsibilities and with budgets under significant pressure, the decisions made on how the capital budget is used is increasingly competitive. The post Grenfell Social Housing (Regulation) Act 2023 ensures social homes are well managed and maintained. The legislation introduces proactive regulation of the consumer standards for homes and regular inspections of social landlords. Awaab's law is a new amendment to the Social Housing (Regulation) Act which forces social landlords to fix damp and mould issues within strict time limits. Stakeholders reflected that within this context, non-statutory, high risk, expensive and difficult to procure retrofit work will not be prioritised.

Local authority budgets are under very significant pressure now with two major local authorities, Nottingham, and Birmingham, recently announced Section 114 notices highlighting severe economic difficulties. The amount of local authority budget given to public housing is being constrained and stakeholders all accepted that they were very unlikely to fill any gap in the ESUK business model. Housing providers are also increasingly risk adverse not being prepared to take on the significant cost risk associated with innovation.

Local authorities have been negatively impacted by the rise in costs and delays to delivery, especially in examples where they need to minimise disruption to residents. In some cases, they have had to use up to £1 million of their own resources to support delivery and make homes suitable to be lived in. This situation is compounded by them not being able to use multiple funding streams to finance retrofit works.

Without long-term funding streams, it is difficult for solution or housing providers to commit to upscaling activity. RA-H is dependent on clear strategic direction and the political decisions made by central government for the long-term planning of retrofit work. Within the lifetime of RA-H UK Government support for whole house deep retrofit has been significantly cut. The first wave of the Social Housing Decarbonisation Fund provided up to £40,000 per property through the Demonstrator Fund but subsequent waves have focused much more on smaller measures (focused on step stages to EPC -C ratings) with funding down to less than £10,000 per property. Without a commitment to scale, market providers will not put the large capital investment required to develop high scale low-cost products. Within this context stakeholders agreed that the significant efficiencies required to drive down whole house retrofit activity will not be found.

Continuing to make the case for whole house retrofit has proven to be very challenging with much a stronger, cheaper, and well-established supply chain for smaller measures. Wave 2 of the Social Housing

Decarbonisation Fund was also widely interpreted as a clear sign that UK Government funding was increasingly focusing upon less intensive measures.

Stakeholders acknowledged that this was making it difficult to make a compelling financial case for whole house measures. The relative maturity of some of the retrofit supply chain brings greater choice and better value for procurement processes with finance decision makers seeing it as a much less risky option.

This was also reflected within decision making throughout the development stage with some delivery leads increasingly looking to procure firmly established products to prevent further delays and cost increases. Some stakeholders expressed frustration that this potentially undermined some of the main rationale behind RA-H but that it was entirely understandable within the context of spiralling costs, extensive delays and unhappy residents.

## 3.3 PROGRAMME DELIVERY

Key Messages:

- Delivery has been very tough with a wide range of factors having a detrimental impact. These issues have caused significant resident disruption.
- Residents living in completed houses have reported a range of benefits.
- Many of these challenges are indicative of the innovative nature of the Programme and a very challenging macro-economic context.
- The Innovation Partnership was regarded by many stakeholders as vital to the delivery of the 61 retrofitted/partially retrofitted properties.
- Re-designs have also seen a focus upon cheaper more easily procured solutions rather than the original ESUK solutions.
- A more rigorous governance framework would have been welcomed by many stakeholders particularly in the context of a very difficult delivery experience.

The stakeholder consensus is that delivery has been tough with a wide range of factors having a detrimental impact upon delivery timescales, cost, and effectiveness. Within this context it is notable that a total of 61 properties have been retrofitted, some organisational progress has been achieved, there has been clear evidence of collaboration, some efficiencies have been established and the Capability Building Workstream has been successfully rolled out. From a GLA perspective, the ultimate goal of RA-H was to develop knowledge and expertise to take action on deep retrofit work as opposed to achieving a large number of outputs. It was always understood to be an innovative pilot programme going through a stage-by-stage process.

That said, these achievements have come through a highly labour intensive and difficult process, supply chain development has proven hard to secure, some projects have been very significantly delayed with the ESUK process substantially deconstructed. Many of the Programme delivery issues are rooted in macro-economic inflationary and supply chain pressures outside the agency of the programme team but stakeholders also attributed many of them to other delivery issues including a rushed design and contract phase, high staff turnover, planning delays, poor housing stock data, differing partner priorities, capacity, skills, and capability issues. Stakeholders agreed that as per the interim review a significant step-change in delivery approach and funding is required if London and the UK are to achieve its net zero goals.

### DELIVERY MODEL

It was accepted by all stakeholders that the RA-H delivery model had come under immense pressure because of the external and delivery issues outlined in Sections 3.4 and 3.5 and the rigid timelines set by external funding providers. Many of these issues were regarded as an intrinsic element of innovation

work but there was a clear acknowledgement that the successful completion of KPIs came in the context of delivery delays and cost increases. These difficulties led to the three HPs leaving the Programme and extensive work being undertaken by the Innovation Partnership, housing, and solution providers to ensure that delivery continues.

In many cases the delivery phase has been characterised by planning and delivery delays, increased costs, resident dropouts, and complaints. Initial designs and retrofit solutions have proven to be incompatible with many of the architypes and very substantial amounts of time and resources had to be deployed at this stage to overcome them, undertake re-designs and ensuring that the projects still meet ESUK's performance guarantee. One housing provider had to provide very significant supporting funds to ensure that their, heavily delayed project could be completed with no further resident disruption.

Re-designs have also seen a focus upon cheaper more easily procured solutions rather than the original ESUK solutions. The solution providers have relied heavily upon subcontractors and a wider supply chain who have less ability to commit to and resource speculative long-term contracts. They have been apprehensive to commit to staff upskilling and 'risky' innovative solutions without a long-term pipeline of guaranteed work.

The Innovation Partnership was regarded by many stakeholders as vital to the delivery of the 61 retrofitted properties. The technical support and expertise provided by both T&T and ESUK, in particular the work of the Retrofit Delivery Managers, was seen as a crucial in helping the HPs that delivered retrofitted properties. The IP helped HPs to fill gaps in both capacity and capability, providing a sounding board for ideas, helping to deliver business models, undertaking cost and market review and analysis, build a case for internal lobbying and manage the delivery process through the Programme Execution Plan. IP support also helped housing providers to develop successful funding applications (Social Housing Decarbonisation Fund, Demonstrator and BEIS Whole House Retrofit funding). Some housing providers reported that the technical assistance had helped to develop their own skills and expertise.

The IP also played a role in trying to stimulate supply chain activity and engage key suppliers with a focus upon cost efficiencies. They supported the GLA with designing the RE:FIT framework. The IP engaged with, and signed up, ten housing providers pairing them with solution providers[11]. They negotiated and signed the eventual contracts with the solution providers. The IP then oversaw the design process and aided with the delivery of the pilot projects. They also set up, administered, and led the Collaboration Hub which stakeholders reported had initially led to unprecedented attempts to find collaborative solutions and cost efficiencies.

For many stakeholders, delivery difficulties have placed significant operational tension on collaborative partnerships potentially undermining the original spirit with in which decisions were made. Tensions that have been exacerbated by the impact delays have upon residents. These tensions saw a less consistent and committed approach to collaboration, and all parties working together to solve specific problems and challenges would have been welcome.

There was an acknowledged loss of collaborative momentum and engagement as funding streams finished, personnel changed and projects experienced difficulties. A high turnover of staff meant that the individuals who originally committed to the Collaboration Hub were often replaced by staff who didn't have the same personal attachment to RA-H.

Stakeholders reported that Collaboration Hub and IP activity did help to scope out and gain some cost reductions, undertake redesigns, provide essential further capacity, high level steering, technical support,

[11] One LB Haringey left the IP following costs and timescale increases

and business case support. There was also frustration expressed that the Collaboration Hub's agenda did not always align with the delivery issues faced. Some delivery providers provided very positive feedback on the support they received from the IP citing technical support as particularly valuable. Others cited less value from the IP.

The Capability Workstream was regarded by participants as an effective exercise for auditing and assessing retrofit capacity and capabilities. Twelve capability audits were undertaken for ten local authorities and two housing associations, with follow up Capability Assessment Roadmaps produced. It was also regarded as a good means to engage housing providers not involved in the other workstreams. Housing providers welcomed the external guidance on how to develop their expertise and the provision of targeted actions with some providers reshaping their internal processes accordingly. That said, provider capacity is still significantly restricted by budgetary pressures to ensure that rescoped/new retrofit strategies can be effectively implemented.

## DELIVERY SCHEDULE

There was some programme slippage as identified in the table below. Marketing activity started four to six months later than anticipated with the launch event taking place seven months after the start date. It was intended that much of the key programme activities were to end in July 2023 however, at the time of writing large amounts of project delivery is still being undertaken. Contract for the ERDF-funded technical assistance team were planned to come to an end in March/April 2023, however following PCR they were extended to July 2023. The GLA final programme evaluation and ERDF summative assessment was due to be completed in July 2023. This was pushed back by five months to December 2023. The changes to the delivery table are summarised in the table below.

| Milestone | Baseline Planned Start Date | Baseline Planned Completion Date | Actual/Latest Forecast Start date | Actual / Latest Forecast Completion date |
|---|---|---|---|---|
| Appoint technical assistance team | April 2019 | April 2019 | May 2019 | May 2019 |
| Review existing client pipeline and develop programme strategy | April-July 2019 | July 2019 | May 2019 | June 2019 |
| Develop marketing strategy | April –July 2019 | July 2019 | May 2019 | August 2019 |
| Begin engagement with existing RE:NEW pipeline client base, based on the programme's new offering | April 2019 | Ongoing | May 2019 | 14 July 2023 |
| Begin marketing activity (as part of overall campaign) to identify a new client base, based on the programme's new offering | July 2019 | Ongoing | November 2019 (website launch)<br>Launch event (Feb 2020) | 14 July 2023 |

| | | | | |
|---|---|---|---|---|
| Key programme activities such as technical assistance to scope projects, identification of finance and funding, procurement, (facilitated) installation, monitoring and verification commences. | July/August 2019 | Ongoing | May 2019 | 14 July 2023 |
| GLA mid-programme evaluation and ERDF summative assessment | November 2020 | November 2020 | November 2020 | November 2020 |
| Contract ends for the technical assistance team as funded by ERDF* | n/a | March/April 2023 | n/a | 14 July 2023 |
| GLA final programme evaluation and ERDF summative assessment | July 2023 | July 2023 | September 2023 | December 2023 |

## 3.4 RESIDENT EXPERIENCES/PERSPECTIVES

At the centre of retrofitting a home is the resident and therefore it is important to consider their experiences of the process.

### COMMUNICATION

Clear communication is important at each stage of the retrofitting process. Some residents spoke positively of extensive communication via letters, conversations, and group meetings prior to signing up to the scheme. One resident highlighted how they felt comfortable to ask questions and were always given detailed explanations. This was important due to the new and complex nature of the deep retrofitting process. One resident gave some advice to prospective beneficiaries:

"…to make sure you keep in contact with them, make sure you get all the information that you can, don't be afraid to ask questions".

For residents who had a positive experience having a central point of contact through the resident liaison officers and staff from Energiesprong was helpful as they were responsive to resident's concerns or questions.

Additionally, the time spent early in the project clearly explaining the process had built a level of trust and transparency in the relationship.

In boroughs where residents have had more negative experiences communication has been cited as a significant issue, with residents stating that it had been limited and unclear. These residents stated that it had proven difficult to report and overcome building issues with no single point of contact for ensuring satisfactory resolution.

In an example of effective communication and resolution one resident had concerns over builders not turning up and not informing them. They fed this back to the liaison officer as the uncertainty of the situation was causing their mental health to worsen. The liaison officer quickly spoke with the builders who subsequently always contacted the resident if there were any changes to their activities. By having an open conversation with the liaison officer, the experience for the resident was improved and the resident reflected that without this intervention they may have not continued with the retrofit due to the impact on their mental health.

### EXPECTATION MANAGEMENT

Residents who had a positive experience of the deep retrofitting process had been given clear early information about the process and projected timeline which helped manage their expectations. During the process, details including photographs of developments further ahead in the process were shared so they could visualise the sorts of changes to expect.

In positive cases the level of disruption was explained clearly to residents before signing up and they reported that the eventual benefits outweighed the issues caused.

One resident reflected that open and honest information about the level of disruption and time the works had been better when compared to previous building works.

In negative cases residents felt that they had been misled about the level of disruption. This has had an adverse impact upon resident relationships with residents expressing significant frustration and upset that the work was leading to greater levels of disruption that they were originally led to believe.

Residents in completed properties were slightly unsure if their energy bills had reduced but reflected that it was difficult to tell due to the rising energy costs. Despite being unsure if energy costs had gone down, all residents were clear that their homes were far warmer and more comfortable to live in. One resident explained the benefits of living in a warm home compared to 'freezing' before the retrofit:

"Let's go by the winter before, when the prices were really high. And we're tight with money, so we wouldn't have the heating on all the time. We would rather sit here with covers on and stuff, freezing cold. And as much as you're keeping yourself warm there, it's still freezing. So you're getting colds easier and stuff like that. Yeah, it does feel beneficial for that".

### TIMELINESS

Residents who had a positive experience of having their homes retrofitted reported the works taking three to six months. Whilst there were some delays the residents were kept updated through good communication which managed their expectations.

For residents who have had negative experiences timescales have been one of their most significant complaints. They reported very high levels of frustration about extensive and expanding timescales, which they state are much longer than they were originally told. They state that this frustration has been compounded by the lack of definitive schedule of work with a clear completion date.

### KEEPING THE RESIDENT AT THE CENTRE OF THE PROCESS

Key to a positive experience was keeping the resident at the heart of the process and a recognition they were opening their homes to strangers and exposing themselves to a complex set of ongoing variables and risks.

Residents who worked shifts explained the challenges of managing this alongside the hours of workmen which often clashed with their own working hours. One resident and their family had to get up early so the builders could access the necessary rooms. As this went on for several months it became increasingly disruptive to the resident. However, another resident in a similar position asked the builders to come later when they were working shifts, and this was accommodated – creating less disruption for the resident.

There were mixed experiences of the respectfulness of builders with some residents commenting how they were considerate, always cleaned up and were friendly and others frustrated at the mess that was left at their property. One resident incurred an injury when falling over building materials whilst others complained about 'rude' and 'disrespectful' contractors. Considerations made to the residents living within the properties whilst work was completed made a large difference to their overall satisfaction rates.

Residents in completed properties spoke positively of the support they had received to adjust to living in their new retrofitted homes. This included new technologies and practices such as not opening windows to allow the property to stay at a constant temperature.

Some residents spoke of unexpected benefits such as improved aesthetics, reduced noise pollution and their homes staying cool in summer. These were welcomed by the residents as additional benefits.

## 3.5 PROGRAMME STRENGTHS AND SUCCESSES

Key Messages:
- The GLA provided added value by driving the culture of knowledge exchange and peer learning across London, which is something HPs would normally struggle to implement themselves.
- There has been some clear collaborative partnership work particularly at the start of the Programme.
- The Collaboration Hub has facilitated knowledge sharing and peer support.
- Nine housing providers were successfully recruited to the scheme.
- The Capability Workstream has been well received by participants.
- 28 whole house net zero retrofits have been undertaken showing that it is possible.
- There is some evidence of an emerging retrofit supply chain.

There have been areas of strength and success, particularly around the establishment of the Innovation Partnership and Collaboration Hub, the number of HPs and local authorities involved, and the Capability Building Workstream. The GLA provided added value by driving the culture of knowledge exchange and peer learning across London, which is something HPs would normally struggle to implement themselves.

**Partnership working and collaboration was at the heart of the Programme.** The Innovation Partnership and Collaboration Hub were widely recognised as well intentioned efforts to develop a cross-organisational approach to whole house retrofit. Stakeholders recognised that they provided frequent, and in some cases unprecedented, opportunities for sharing difficulties, issues, challenges, solutions, and experiences. Meetings were a mixture of in person and online, full day sessions and away day visits to manufacturers. Over eighteen months twelve meetings were held with an emphasis on building collaborative spirit and providing regular engagement opportunities to ensure active participation fostered over this period of time. At its height representatives from 20 organisations were attending the meetings.

**Knowledge sharing and peer support facilitated by the Collaboration Hub was important.** RA-H fostered collaborations between HPs and SPs who both showed a clear willingness to share learning, seek solutions and try to seek efficiencies. Momentum was regarded strongest in the early design stages of the Hub with large amounts of learning shared (including cost information) and a genuine shared focused on bringing down costs. However, it was observed that as projects moved to the delivery stage and HPs and SPs became increasingly focused upon their own complex delivery programmes. This collaborative momentum was harder to maintain and the Hub's programme/agenda was not always aligned with directly overcoming operational difficulties. HPs and SPs have learnt a huge amount from ESUK.

**RA-H has consistently displayed a clear commitment to the ERDF horizontal principles of equality and inclusion**. Large investment in improving the quality of social housing and reducing fuel poverty are

rooted in commitments to social equality, inclusion and improving the quality of life of London's poorest residents. The annual energy bill savings of £1,249 will have clear equality benefits for residents.

RA-H successfully reached a range of HPs and London local authorities. The early momentum brought by the IP helped to promote RA-H and recruit projects to the programme. Recruitment, primarily led by ESUK, was seen as a positive and successfully sold the programme to HPs, and residents. However, it must be noted that in cases of disruption and delays, the failure to live up to expectations set out during the recruitment phase increased negative sentiment. The recruitment process saw 10 schemes onboarded to RA-H in two Tranches, across nine HPs including two outside of London. In Tranche one four London local authorities were recruited (Sutton, Barking & Dagenham, Ealing, and Haringey) followed by a further three in Tranche 2 (Lambeth, Hammersmith & Fulham, and Enfield).

*We ended up with four suppliers that brought a supply chain with them. We were happy with bringing in four suppliers. They brought different approaches to ES design processes.*

Introducing the Capability Building Workstream was successful and it created benefits for local authorities. Good progress has been achieved in increasing understanding of retrofit amongst local authorities and increasing their capability. The partners delivering the Capability Building Workstream have achieved their KPIs and beneficiaries report that the capability assessments have helped identify areas for improvement. Beneficiaries have benefited from understanding strengths and weaknesses in their processes such as data collection, processes and KPI targets associated with housing decarbonisation and how these link to other internal processes. The support also diagnoses skills gaps (e.g. PAS 2035). In some cases, the capability assessment confirmed what officers suspected and provided added value by providing evidence to make an internal case for change and to inform policy decisions. Overall, the Capability Building Workstream has enabled local authorities to access technical and moral support they otherwise would not have.

Full-house retrofit has been proven to be technologically possible. The completion of full house retrofits and achievement of ERDF outputs does show that solutions exist to make homes net zero using the ESUK approach. As Section 4.3 outlines, strong Standard Assessment Procedure (SAP) improvements have been achieved across eleven different housing archetypes. Notwithstanding the financial and logistical challenges and disruption to residents experienced in some projects, viewed purely as a pilot of full house retrofit RA-H has achieved what it set out to do. Where projects have been completed more smoothly housing providers are pleased to have achieved it and have ambitions to secure funding for future retrofit projects in their property stock. Similarly, where projects have been completed resident's energy bills have been significantly reduced helping to address fuel poverty whilst reducing carbon emissions.

*"There was someone who's grandchildren wouldn't visit him because it was too cold but now he can afford to heat it well".*

The completed houses have provided residents with clear benefits. Consultation in Enfield with residents living in completed properties highlighted common themes. There had been obvious aesthetic improvements with the properties clearly differentiated from neighbouring properties (of the same age and type). Residents reported reduced noise disruption from busy nearby roads with triple glazing and new doors providing much improved noise insulation. Residents also reported warmer homes with the housing retaining heat without having to have central heating on permanently, this has resulted in reduced energy costs. All the residents spoken to would recommend the improvements to others, with

the eventual benefits outweighing the disruption caused. The residents also reported positive relations with the contractors, with a trusting relationship developed through continue dialogue, the sharing of key information and the presence of an effective resident liaison officer.

*"(Previously) We wouldn't have to heat on all the time we needed to save money We would sit freezing cold. Now it has just been a constant there. It's not too hot. It's not too cold."*

**There are signs of market development and an emerging nascent supply chain.** Solution providers involved in the programme have established a legacy and created potential for future growth. For example, Equans and Osborne are marketing whole house retrofit outside of their RA-H projects. Meanwhile, one of the suppliers, Ultrapanel, is looking to invest in a new facility in London whilst others have also been able to enter the London market on a larger scale than they otherwise would have.

## 3.6 PROGRAMME CHALLENGES

Key Messages:
- Project delivery has been characterised by delays and increased costs.
- The delayed contract process put increased pressure on an already shortened design phase.
- Delivery challenges have created cross organisational tensions.
- Incomplete and incorrect housing data made delivery challenging.
- Inflationary pressures have seen costs significantly increased and created substantial challenges for the business model.
- Contractual concerns remained a significant issue throughout the Programme with ongoing issues around the complexities of KPIs, specifications, performance standards and timescales.

**Significant delays to the signing of contracts** had a detrimental impact upon the amount of time the IP could dedicate to the vitally important design stage. Following an extensive clarification process to iron out contract concerns (from both parties) six delivery contracts were not signed until Q4 2021. These negotiations were widely regarded as difficult and complex with the large number of contract clarifications reflecting concerns about a new and innovative process, different parties' competing demands, and the volume of potential unforeseen scenarios.

Despite the lengthy process undertaken, some housing providers expressed frustration at the limited number of penalty and clawback clauses that they felt made it very difficult to provide rigorous accountability when projects were delayed and went significantly over budget. Solution providers stated that these refinements were part of an essential due diligence process to ensure that all project risk did not fall upon them. Contractual concerns remained an issue for some HPs and SPs throughout the Programme with ongoing issues around the complexities of KPIs, specifications, performance standards and timescales. It is however important to acknowledge that different parties will always seek a favourable contracts and in this context the GLA contract had to reflect multi-party interest and shared risk. It is unclear that the different views are obviously reconcilable.

Some housing providers also stated that they would have liked much more agency of contract and procurement decision making feeling that they had little say in the choice of solution provider.

**Programme governance and management structures came under significant pressures** once delivery issues became increasingly apparent. The complexity of these difficulties required much more intensive and sophisticated project management processes than originally planned. Retrofit Delivery Managers, HPs and SPs all had to commit to large amounts of extra time to the projects to find solutions to ongoing challenges.

**The initial collaborative spirit of the programme became increasingly difficult to maintain** as the projects encountered significant delivery issues. Stakeholders acknowledged the large level of risk associated with the Programme and when difficulties became apparent there was a general sense that partners often retreated from collaboration towards protecting their own commercial, political, and strategic interests. This led to a more traditional adversarial approach to the project delivery between the housing and solution providers with operational pressures limiting the amount of time that could be dedicated to collaboration. In terms of delivery, more successful projects have relied on individual officers within local authorities to drive projects forward.

**Not all projects started with a clear picture of the condition of the social housing stock making carrying out extensive retrofit work challenging**. Social housing in London is often in poor condition and the variance in housing type, style and internal structure and fabric means that a uniform approach to retrofitting is difficult. This issue has been compounded by limited and insufficient data. Housing provider data has often been outdated and incomplete with significant challenges, such as the presence of asbestos, only becoming apparent during the delivery phase. This has led to substantial delivery delays as data was sourced (with associated expense) and projects were rescoped and redesigned. This has also created large amounts of resident dissatisfaction as timescales are extended far beyond those originally outlined. It has also led to large increases in costs.

Much of London's housing has a mixture of lease ownership which brings further complexities making retrofit work on entire housing blocks challenging, and in some cases unfeasible. Leaseholders have been reluctant to commit any financial resources and/or take on any of the project risk. Private leaseholders often do not have access to funding or technical support for retrofit and very limited incentive to improve energy performance. With retrofit work not having a direct impact on leaseholders this is not viewed as a priority. Stakeholders reflected that the breakup and sale of former public housing stock into a fragmented picture very challenging.

*"This large scale retrofit process would have been much more feasible in the pre-1980s period where the Councils owned whole blocks of housing."*

**All projects, apart from Enfield and Sutton, have experienced significant delays with some project going twelve months over their original deadlines**. The original ERDF contract was for 50 properties to be delivered by July 2022, with an additional 15 properties delivered by April 2023. Due to significant project delays the agreed end date was updated to 14 July 2023.

These delays have been caused by a wide variety of issues including the discovery of asbestos and additional rooms, planning issues, insufficient survey data, insufficient/unsuitable specifications, skills deficits, staff turnover and long supply chain lead in times. The very limited level of offsite construction has also caused significant delays to the projects. The innovative and new nature of the work has also meant that there are no tried and tested techniques for contractors to fall back to.

These delays have seen costs spiral as design solutions are sought within the performance criteria. causing significant operational tensions between housing and solution providers. The residents have been adversely affected with timescales far exceeding those initially communicated to residents. This situation has led to a significant resident disruption and in some cases significant levels of resident complaints and dropouts. One local authority currently has over twenty Stage Two complaints from participant residents with their representative citing a 90%+ resident dissatisfaction level. As residents pull out of the scheme delays are exacerbated as new properties are sought.

Delays and increases in costs have also placed an increased financial burden on both housing and solution providers with costs of up to £1 million falling upon one local authority.

**Capacity and capability limitations continued to adversely impact project delivery becoming particularly acute when delivery issues arose**. These difficulties were compounded by high staff turnover amongst key partners[12], with vital experience and expertise lost. This led to a heavy reliance upon IP support particularly the support offered by the Retrofit Delivery Managers. Some local authorities involved in the Capability Workstream cited this, and concerns about cost and the maturity of the market, as the main reasons why they did not sign up to the Programme.

The interim review recognised that ongoing resource limitations within housing providers was an issue. It highlighted the level of resources required to establish and run deep retrofit projects as particularly challenging in a context of limited funding, rigid funding timeline and an immature supply chain.

The sporadic nature of much of the development also made it difficult for SPs and sub-contractors to commit staff long-term to projects or to commit staff to training opportunities. One stakeholder cited a delivery project where the site time had changed three times. This also had an adverse impact on expertise and experience bringing further delays and cost increases.

Coupled with the resource intensive nature of development and limited upskilling opportunities, many stakeholders were pessimistic about housing providers ability to manage these complex projects soon without significant outside support. The addition of the Capability Workstream was seen as a welcome addition to RA-H but stakeholders agreed that there had not been enough improvement in capability or capacity to avoid having to add the significant additional consultancy costs into future business modelling.

**Recent inflationary pressures upon household budgets led to increased concerns about the Comfort Plan being expressed by the housing providers**. Local authority politicians are extremely wary of adding any additional costs to their tenants. Stakeholders agreed that the wider context of a 'cost-of-living crisis' made the Comfort Plan a very difficult sell. This meant that a vital constituent part of the ESUK business model became increasingly vulnerable as economic pressures increased. In one case a housing provider withdrew the requirement for tenants to pay the Comfort Charge. Stakeholders agreed that continued work was required on selling the Comfort Charge to housing providers with many calling for an increased emphasis upon the fuel poverty benefits of being able to guarantee a constant minimal residual temperature and supply of hot water.

**Developing the mainstream whole house deep retrofit market from its pre-programme has been challenging.** The focus on aggregating housing provider demand and developing collaborative solutions was regarded by stakeholders as a potentially good, albeit very ambitious, method of stimulating investment and building a long-term commercially sustainable method.

There was a consensus that partners entered RA-H with a shared determination to find shared cost savings, aggregate demand and stimulate market development. The Collaboration Hub activity was regarded as a good means for undertaking this activity with many attendees stating that there was a clear initial sense of shared purpose. This shared purpose would have been better maintained in the delivery phase with an agenda that provided scope and a forum for the resolution of substantive issues.

[12] Stakeholders highlighted that net zero and retrofit skills are currently in high demand and consequently the whole sector is experiencing high turnover of staff.

Large amounts of time and resource was expended working with potential innovative supply chains with specific manufacturers targeted because of their cost reduction potential. There was a particular focus on energy pods and wall & roof panels. A wide range of solutions are being developed by several companies for the project, including energy modules such as Monodraughts and Ventive, and off-site manufactured insulation panels from Innovare, STO, Langley, British Offsite, Melius Homes and Ultrapanel. Significant focus was also placed upon process improvements with continued analysis on where process and service efficiencies can continue to be found,

That said, despite the efforts of the Programme very few manufacturing companies are still delivering offsite manufactured solutions and the market remains very much in its infancy. As projects got mired in on-site delays commitments to offsite delivery were watered down with a focus upon cheaper more easily procured/available methods. In the words of one stakeholder as timescales significantly increased from early projections delivery teams "could not wait on the market to catch up". Development delays and watered down commitments also made suppliers increasingly unwilling to make long-term financial investments.

Stakeholders agreed that to have a significant impact upon the market a long-term co-ordinated approach was important but that it must be accompanied by guaranteed long term funding sources that mitigate capital investment risk. Stakeholders acknowledged that significant Level One and Level Two provider investment is highly unlikely as long as the whole house retrofit market is associated with very substantial risk. Without this investment in offsite mass production techniques, it is very hard to see how further significant cost efficiencies can be achieved.

For these reasons it was widely acknowledged that in the short-term the ambitious objective of providing a secure long-term pipeline of work through RA-H had not been achieved. There had only been a "modest" level of market development during the ERDF funding period although it is too early to make a judgement on whether this will be realised in the medium/long term. The GLA is continuing to fund technical support whilst projects are still being delivered, creating potential for further supply chain and market development beyond was achieved by the end of the ERDF funded programme.

## 3.7 PROGRAMME IMPROVEMENTS

Key Messages:

- Improving the quality of housing data needs to be a housing provider priority, this will help to develop multiple design processes for a wide range of archetypes.
- Improvements need to prioritise reducing resident disruption.
- Significant efficiencies could be gained from the use of smart digital technologies.
- Continued improvements in housing provider capacity and expertise will allow outside support to be focused upon the most challenging technical aspects of design & delivery.
- Emphasise the fuel poverty benefits of the Comfort Plan.
- Retrofit improvements need to be seen within a holistic package of social housing improvements rather than measures that only come after statutory responsibilities.

Stakeholders were very keen to stress their ongoing commitment toward deep retrofit solutions reaffirming their commitment to decarbonising the social housing stock and tackling fuel poverty. There was an acknowledgement that efforts to develop the offsite supply chain had not yet achieved the growth desired and that many projects had encountered significant issues. In response to these difficulties, stakeholders and beneficiaries did identify a number of potential improvements.

- Improving the depth, breadth and consistency of housing data. Better data would ensure that the design of retrofit interventions are based on an accurate picture of the condition, layout, structure and energy performance of homes. Stakeholders were very keen to see shared best practice across different providers to ensure that the data fully reflects the picture on the ground.
- Digital technology can be better used. RA-H piloted off-site manufacturing, which is one element of Modern Methods of Construction (MMC). In keeping with MMC innovation, digital technology could be better used. For example, using a Building Information Modelling platform across the lifecycle of a project to collect baseline data, create a digital twin of properties, design and model interventions, and shared with all subcontractors, planners and residents. Some stakeholders were optimistic that efficiencies from digital process management and smart technology surveying tools could have a big impact, with potential to reduce costs by up to 25%.
- Closer co-ordination with planning departments during the design stages to ensure that procedures are fully compliant with planning regulations. Frustration was frequently expressed about delivery being held up whilst solutions to planning restrictions were being sought. Stakeholders felt that these processes should have been fully considered and resolved during the design stages.
- More attention needs to be given to resident disruption, to manage expectations, articulate timetable changes and provide clear contingency measures. There were numerous examples of very significant delays to the originally provided timetable. Some residents reported very high levels of frustration and upset about ongoing disruption, incomplete works and limited communication and commitments to future schedules of work. Stakeholders have a shared understanding that the resident experience of the delayed projects was unacceptable. Some Innovation pilots are by their very nature hard to plan for with certainty. Even so, there was a clear sense that resident buy-in needs to be built around realistic timescales not a best-case scenario.
- Continue to improve housing provider capacity and capability to reduce the long-term reliance upon outside support. The support provided under the Capability Workstream was welcomed, although this was seen as a first step in a very important process. Housing providers showed a clear desire for a long-term support package that upskilled them improving expertise to a level where they would only have to 'buy-in' outside support on the most technical aspects of projects or where additional capacity was required. The role of the IP could be rescoped towards the provision of this specific technical support in areas such feasibility studies, business case and funding bid support, and contractor management.
- Developing multiple delivery models that allow tailored solutions according to architype. There was a wide acceptance that changes (and potential future changes) to Government funding criteria coupled with realism about the current maturity of the retrofit market calls for the development of a suite of retrofit packages that includes both whole house and smaller retrofit measures. These packages can then be 'shelf ready' for future funding/market developments.
- Update the marketing of the Comfort Plan with more emphasis on the impact it has upon fuel poverty. The Comfort Plan was seen as a particular vulnerability when Housing Providers were considering the Programme. Some stakeholders felt that an increased emphasis upon the impact it could have upon fuel poverty was needed to allay some of these concerns and emphasise the strategic importance of the Programme. Residents in completed homes indicated

that the significant benefits of reduced energy bills and warmer homes outweigh the disruption caused during the improvement work.

- **Integrating retrofit into a more holistic package of social housing improvement** that brings together retrofit, fire & safety, damp & mould and routine maintenance and upgrade measures. Some frustration was expressed that housing providers still often see these measures in isolation and optimism was expressed that further cost savings could be found by developing one holistic approach. It was felt that this would make it easier to gain internal buy-in for retrofit at HPs and Local Authorities.

## 3.8 FUTURE OF THE PROGRAMME

Key Message:
- There is concern about the future viability of the RA-H in its current form in current market conditions, although evidence from delivery in 2024 will also need to be reviewed.
- Local authority financial concerns means that they are increasingly risk averse.
- Stakeholders want to see the rich learnings and lessons learned incorporated into a playbook for future similar programmes.
- Future programmes should be shaped around the current market/funding sources with a focus on collaborative incremental work to develop whole house solutions.

**Widespread concern was expressed about the future of the** programme in the context of rising costs, development delays, tight housing budgets, changes in Government funding criteria and slower than hoped market development. These issues raise risks which must be considered when planning future phases of the Programme. There are questions as to whether RA-H funding can enable enough whole-house retrofits to meet the GLA's GHG reductions KPI[13]. Similarly, faced with rising costs, a very limited supply chain, unsatisfied residents and reduced funding housing providers are moving towards cheaper, easier to procure and less complex retrofit measures. Although it must be acknowledged that current challenges should not obscure the long-term benefits that may still be realised from the Programme.

**Local authorities are increasingly risk averse**, a situation that stakeholders believe was unlikely to change as we enter the next electoral cycle and spending restrictions continue to be put in place. Housing providers were not confident that they would be able to highlight value for money and this would mean that it was highly unlikely that the pipeline of potential housing improvements would translate into delivery.

*"Everything needs to make sense – residents, cost, impact, market capability – where we don't see any significant risk."*

**There was a clear desire expressed for the wide variety of lessons learnt, and successful elements of the Programme to be incorporated into future iterations of decarbonisation work**. Stakeholders agreed that the collaborative and technical support elements of the Programme should be central elements of future iterations. One widely cited example of this was the repurposing of any Collaboration Hub time to develop a detailed playbook/user-friendly manual that fully incorporates the rich material and learnings. The GLA were also regarded as having a vital facilitation and collaboration role in bringing the myriad of HPs across the capital together to transfer knowledge, share experience and find collective solutions to the retrofit challenge.

[13] GLA target of 1,678 homes to receive deep retrofit with 4,161 tonnes of $CO_2e$ saved annually.

**Many stakeholders agreed that the absence of secure long-term funding for whole house deep retrofit future iterations means that the Programme should pivot towards the market and funding sources**. This approach has brought significant delivery and carbon saving impacts (at a lower cost) for some local authorities albeit not with whole house projects and to lower energy efficiencies. Stakeholders wanted to see continued efforts to work closely with supply chains looking at incremental development with an intention to scale up when best value and standards could be achieved.

# 4 PROJECT PERFORMANCE

This chapter reports on the spending and outputs at the time of the evaluation for the Retrofit Housing Accelerator Programme. The section also estimates the impact of the investment on carbon savings.

The spending and output data in this chapter was collected by the GLA programme management team.

## 4.1 EXPENDITURE PERFORMANCE

The initial GLA funding contributions are outlined below as per the ERDF funding agreement. Data shows that at the time of evaluation. 100% of the allocated funding had been spent. Issues with defrayal meant that although the budget was spent during the claim period, £387,970 wasn't defrayed in the claim period and therefore £193,985 of ERDF match-funding couldn't be claimed.

### RA-H Expenditure

| Expenditure | Original Funding Agreement (£) | Current Funding Agreement (£) | Amount | % of Target |
|---|---|---|---|---|
| Total ERDF Expenditure | £2,192,197 | £1,584,275 | £1,584,275 | |
| Total Match Funding (£m) | £2,192,196 | £2,977,776 | £2,977,776 | |
| Total Expenditure | £4,384,393 | £4,562,000 | £4,562,000 | 100% |
| Total Claimed | | | £4,174,030 | 91.4% |

## 4.2 PERFORMANCE AGAINST ERDF OUTPUTS

The GLA had two contractual ERDF outputs. The table in Section 4.2 outlines outputs achieved against targets as based on the most recent project management data. The Programme has made good progress in both output areas:

- 61 households had completed whole-house retrofit (ERDF definition). This was 94% of the Programme's target of 65 households.
- 143 tonnes of greenhouse gas emissions (GHG) reductions were estimated to be achieved, 87% of the Programme's target of 161 tonnes.

### Funding Agreement Outputs and Delivery (including revised targets – after extension)

| Indicators/Expenditure | Original Funding Agreement Targets | Revised Funding Agreement Targets | Delivery or expected delivery at Closure | Proportion Achieved (%) |
|---|---|---|---|---|
| (C31) No. of households with improved energy consumption | 50 | 65 | 61 | 94% |
| (C34) Estimated GHG reductions (tonnes of $CO_2e$ | 124 | 161 | 143 | 89% |
| GLA - Number of homes procured[14] to receive deep retrofit | 1,678 | N/A | 1,891 | 112% |
| GLA Procured potential annual GHG reductions resulting from KPI 3 (saving in tonnes of $CO_2e$) | 4,161 | N/A | 6,998 | 168% |
| GLA - Number of capability assessments completed | 12 | N/A | 12 | 100% |
| GLA- Number of capability building workshops delivered | 8 | N/A | 8 | 100% |

Source: GLA Monitoring Data, Programme Management Team

All four of the GLA KPIs have been achieved with all the capability assessments and workshops delivered. 1,891 homes have been procured with 6,988 tonnes of potential annual $CO_2e$ reductions. For the reasons outlined in Chapter 3 it is very unlikely that these retrofits will be delivered with RA-H in its current form.

Reducing carbon emissions was one of the two ERDF outputs. To assess this, ESUK applied a Standard Assessment Procedure (SAP) to assess the performance of the properties. All energy use figures were calculated using SAP 10.2 modelling with the results converted into pre and post retrofit kWh units. This energy use was then converted into carbon savings using the following factors from 2017.[15]

### Carbon Savings Conversion Factors

| Fuel | Carbon Factor |
|---|---|
| Gas (gross CV) (tonnes $CO_2e$/kWh) | 0.000184 |
| Grid electricity (2017) (tonnes $CO_2e$/kWh) | 0.000352 |

Source: BEIS (2017)

Most of the whole house retrofits were completed within Sutton (13), followed by Enfield (10) Barking & Dagenham (3) and Kensington & Chelsea (2). Combined, the whole-house retrofits led to GHG emissions reduction of 143 $tCO_2e$.

### Outputs Per Housing Provider

[14] Contracted to receive retrofit does not necessarily mean retrofit activity has been delivered.

[15] DESNZ and BEIS (2017). 'Greenhouse Gas Reporting: Conversion Factors 2017'. Available here.

| Housing Provider | Number of Properties (Whole House Retrofit) | Combined Carbon Saving (tonnes of $CO_2e$) |
|---|---|---|
| Sutton | 13 | 47.7 |
| Enfield | 10 | 29 |
| Barking & Dagenham | 3 | 8.4 |
| Kensington & Chelsea | 2 | 4.8 |
| Ealing | 21 | 44.4 |
| Lambeth | 9 | 4.5 |
| Sutton | 3 | 4.2 |
| **Total** | **61** | **143** |

Source: ESUK (2023)

## 4.3 OUTCOME PERFORMANCE

Across the 61 retrofitted properties SAP rating improvements were achieved for each of the different archetypes. The following table outlines these improvements.

### SAP Rating Improvement by Archetype

| Housing Provider | Archetype | SAP Points Improvement |
|---|---|---|
| Sutton Housing Partnership | Archetype 1 (traditional semi-detached) | 23 |
| Sutton Housing Partnership | Archetype 2 (traditional end of terrace) | 20 |
| Sutton Housing Partnership | Archetype 3 (traditional mid terrace) | 25 |
| Sutton Housing Partnership | Archetype 4 (Unity semi-detached) | 42 |
| Sutton Housing Partnership | Archetype 5 (solid brick semi-detached) | 35 |
| Ealing | Archetype 6 (solid brick terrace) | 27 |
| Enfield | Archetype 7 (solid brick semi-detached) | 17 |
| Lambeth | Archetype 8 (timber frame terrace) | 13 |

| Housing Provider | Archetype | SAP Points Improvement |
|---|---|---|
| Barking & Dagenham | Archetype 9 (solid brick terrace) | 17 |
| Kensington & Chelsea | End of terrace house | 28 |
| Kensington & Chelsea | Ground floor flat | 10 |
| **Average** | | **23.4** |

Source: ESUK (2023)

| Fuel Type | Energy Consumption Pre-Retrofit | Estimated Annual Bill Pre-Retrofit | Energy Consumption Post Retrofit | Estimated Annual Bill Post Retrofit | Estimated Annual Energy Bill Saving |
|---|---|---|---|---|---|
| Electricity | 14,894kwh | £1026.20 | 2,029.3kwh* | £555.01 | £471.19 |
| Gas | 2,864kwh | £783.30 | 0kwh | £0.00 | £783.30 |
| **Total** | **17,758kwh** | **£1809.50** | **2,029.3** | **£555.01** | **£1,254.49** |

Source: Kada Research (2023) using ESUK figures (2023)

*Net figure once PV generation has been accounted for

Using ESUK figures we estimate that on average each completed property would save the resident £1,254.49 annually.

## 4.4 VALUE FOR MONEY

Escalating costs have led to the GLA and Local Authorities having to spend more on the Programme than planned, the full amount of which is not clear at the time of writing. Similarly, delivery partners have indicated that the Programme has cost them more than originally budgeted for. Considering this, and given the programme was primarily piloting innovation rather than aim to create direct economic impact, it is not appropriate to undertake an economic impact assessment.

In terms of carbon emissions, RA-H has claimed a reduction of 143.2t$CO_2$e. With a planned programme cost of £4,174,030 this equates to a spend of £29,148 per tCO2e of saved.

The programme cost does not capture significant spend by some HPs to complete delayed projects and resolve resident disruption, estimated to be up to £1m by one HP. Combined with a lack of demonstrable per-property cost reductions to deliver whole-house retrofit this raises questions about the viability of the current RA-H business model.

# 5 CONCLUSIONS AND LESSONS

This section presents a recap of the key messages and reflects on lessons learned that have emerged from the evaluation.

Building on the lessons learned and with a look to the future, the report ends with recommendations and concluding remarks.

## 5.1 RECAP OF KEY MESSAGES

RA-H was delivered in the face of a range of **external challenges**:

- RA-H has been impacted by unprecedented supply chain inflation and shortages due to the global economy recovering from Covid-19, shocks like the war in Ukraine, and in the UK, adjustment to Brexit.
- Short programme timescales influenced delivery. The project extension was welcome, however SPs still faced pressures to deliver quickly, reducing the appetite to use more innovative approaches which RA-H was aiming to facilitate.
- Local authorities and housing providers focus upon statutory responsibilities means retrofit activity is not prioritised.
- A lack of long-term guaranteed funding sources makes housing providers unwilling to commit to the pipeline of work that the market needs to de-risk capital investment.
- The market/supply chain is much more developed for partial retrofit measures, making the case for whole house retrofit at this time very challenging.

External challenges partly led **to delivery challenges**:

The most important challenge is that delivery and completion have been characterised by delays and increased costs for some projects. In these projects this has caused significant disruption to the lives of residents, has placed financial pressures on HPs and damaged relationships with SPs. Other challenges are indicative of the innovative nature of the programme and a very challenging macro-economic context, and include:

- Re-designs have also seen an initial focus upon cheaper more easily procured solutions rather than the original ESUK solutions.
- Consistent tracking of critical success factors and KPIs at every stage of projects from design to completion may have flagged risks earlier, before turning into major challenges.
- The delayed contract process put increased pressure on the design phase.
- Programme governance & management structures and the commitment to collaboration came under significant pressures once delivery issues became increasingly apparent.
- Incomplete and incorrect housing data in some projects made delivery challenging.
- Inflationary pressures have seen costs significantly increase and created substantial challenges for the business model.
- The development of the whole house offsite construction market at this early stage has been minimal.

- Contractual discussions remained a significant issue throughout the Programme, due to the difficulties of creating contracts that share the risks of innovation between different parties without disincentivising commercial investment.

Despite these challenges, RA-H does have strengths and successes particularly around the establishment of the Innovation Partnership and Collaboration Hub, the number of HPS and local authorities involved, and the Capability Building Workstream.

Headline strengths and successes were:

- The GLA provided added value by driving the culture of knowledge exchange and peer learning across London, which is something HPs would normally struggle to implement themselves.
- There has been some clear collaborative partnership work particularly at the start of the Programme.
- The Collaboration Hub has facilitated knowledge sharing and peer support. With a refined agenda it has the potential to be an excellent forum for resolving operational issues in a collaborative manner.
- Nine housing providers were successfully recruited to the scheme.
- The Capability Workstream has been well received by participants provided vital insights into how retrofit capability can be enhanced. It has also increased the pool of HPs involved in RA-H.
- 61 whole house net zero retrofits (ERDF definition) have been undertaken showing that it is possible. Residents living within completed homes report reduced noise pollution, improved aesthetics, warmer homes, and reduced energy consumption.
- The Innovation Partnership was regarded by many stakeholders as vital to the delivery of the 61 retrofitted properties.
- There is some evidence of an emerging retrofit supply chain, especially for specific components of retrofit. This demonstrates increased scope for using some elements of whole-house retrofit moving forward, for example panelised solutions and energy pods.

Consultation with stakeholders and beneficiaries identified several ways to improve the programme:

- Improving the quality of housing data needs to be a HPs priority, this will help to develop multiple design processes for a wide range of archetypes.
- Improvements need to prioritise reducing resident disruption and provide a clear lines of communication and responsibility for residents experiencing issues.
- Significant efficiencies could be gained from the use of smart digital technologies.
- More contingency funding and time built into the programme to protect HPs and SPs against financial risks.
- More early-stage work to engage with SPs to co-design an innovation project delivery model which aims to better share and reduce risk across all parties.
- Continued improvements in housing provider capacity and expertise will allow outside support to be focused upon the most challenging technical aspects of design & delivery.
- Emphasise the fuel poverty benefits of the Comfort Plan to increase take-up.
- Retrofit improvements need to be seen within a holistic package of social housing improvements rather than measures that only come after statutory responsibilities.

## 5.2 LESSONS AND FUTURE CONSIDERATIONS

Lessons that emerged from the evaluation are broken down by lessons for programme design, programme delivery, and programme design in keeping with ERDF requirements with additional considerations for the GLA.

### LESSONS FOR THOSE DESIGNING SIMILAR PROGRAMMES

**Risk needs to be designed out of future programmes**. Perhaps the most important lesson is the challenge of designing an innovation project which uses occupied homes rather than a test-bed environment. Typically, successful innovation programmes de-risk the innovation process for stakeholders and beneficiaries as much as possible. This was not necessarily possible with RA-H. This is primarily because it involves real homes lived in by residents. For example, industrial innovation programmes often provide access to digital or physical twins of commercial processes in an R&D setting, where new technologies can be tested and iterated until they are proven to be technologically and commercially viable. Large transport and engineering innovation projects tend to use a test-bed environment to with few real-world end users to prove technological and commercial viability. In both examples, finding out that things fail and trying other solutions is a key part of the innovation process. Using lived-in homes as the test-bed creates a new area of risk – residents – which innovation projects would generally not face, and finding out that things fail is not acceptable when it impacts on the liveability and safety of peoples' homes.

Other lessons raised from the evaluation are:

**Tracking critical success factors (CSF) and KPIs can be made more robust and consistent to help manage risk and change**. A process is required where all parties report risks and cost increases as they happen and take pre-agreed actions based on pre-agreed responsibilities. Key to this is ensuring work does not start on a house until all elements of whole-house retrofit are in-place and sequenced. For example, if a project dashboard identifies a supply chain risk to certain retrofit components, then actions may include pausing delivery whilst identifying an alternative source or rescoping to use different innovative solutions. This in turn would trigger a review of financial implications and a communication to HPs and residents. The fact that some projects started without SPs having accurate survey information about the houses (in one case not knowing how many bathrooms there were) or faced supply chain delays after construction started suggests a lack of effective monitoring of the right CSFs and KPIs.

**Timelines dictated projects rather than project requirements**. Some SPs have reported that programme timelines were restrictive, with a feeling of being pressure during the design stage to provide costs and innovation specifications too quickly. This led to a focus on starting projects too early to the detriment of vitally important processes. Part of this was driven by a sense that outputs needed to be delivered within the ERDF funding period. The GLA have been flexible in this regard, with delivery still ongoing with technical support being funded by the GLA after ERDF funding has ended.

**Capability building was a success but does not address capacity constraints**. Beneficiaries valued the capability support and the advice it provided. However, some of the recommendations could not be implemented due a lack of capacity. For example, one local authority valued being signposted towards PAS2035 certification training however they did not have the resource to send staff on training and to back-fill existing roles. Similarly, capability support has helped identify funding opportunities, the need for better data, and the need for new processes or strategies. However, beneficiaries would welcome additional capacity support to help implement and deliver recommendations.

## DELIVERY LESSONS

**Starting work on site before all sufficient components have been supplied or manufactured increases risk**: Some of the longest delays occurred where contractors found unexpected structural conditions in properties, or when supply chain delays meant works could not be progressed. In some instances, this arose from inaccurate surveys (e.g. a room was missed out in one property) and could have been partially avoided with a more robust process. In some cases, supply chain delays were unavoidable and due to external factors. In either case, taking more time to survey properties, scope and design the projects, and then delaying delivery until all components were available would the minimised time on site and resident disruption. Not working to strict funding and delivery timeline would allow for this.

**A single initial point of contact between RA-H and HPs would be beneficial:** Some HPs were part of a RA-H retrofit project and the Capability Workstream, which meant they had different points of contact from the delivery partner. In one instance, a Local Authority officer taking part in the Capability Workstream knew that Turner & Townsend were working with colleagues on a housing project but did not know both activities were part of RA-H.

**A more dedicated and committed approach to collaboration** would help HPs and SPs work together to overcome shared challenges. This needs consistent attendance from those involved and should take a challenge-based approach. This means the agenda for meetings is set by the main challenges projects are facing, and meetings end with clear actions and follow-ups resulting from discussions on how to solve challenges. Some issues may need a sub-group to work together more closely and frequently.

**A frank and honest initial conversation with residents about timescales and potential difficulties before work starts** would minimise resident dissatisfaction. Resident visits to the improved housing stock would help them to conceptualise the scale of the improvements and to help shape their expectations.

**Digital tools and AI can provide efficiency and scalability**: some local authorities conducting retrofit activities outside RA-HI cited potential significant savings from the use of smart technologies/AI during the surveying processes. ESUK are also exploring the potential digitalisation of process management again citing significant potential savings. As more smart/AI products enter the market ongoing efficiencies have the potential to significantly improve retrofit business models, in keeping with wider modern methods of construction innovation, building information modelling, and growing use of digital and AI in the whole life cycle of construction projects.

## LESSONS FOR POLICY MAKERS

**Funding.** Market development and investment requires pipeline and demand certainty. In turn, housing providers and local authorities require long-term funding guarantees to mitigate their risk. Local authorities are not always able to submit bids to funding pots like SHDF before application cycle deadlines close. Having longer application windows or rolling deadlines would enable more local authorities to apply at a time which is right for them. In addition, funding is not always sufficient to meet local decarbonisation needs and high capital investment costs. It also often comes with inflexible criteria and outputs which limits the number of projects being brought forward.

**Mixed methods will be important for the future of home retrofit**: Whole-house retrofit is only one solution for reducing GHG emissions from homes. In some cases, a low number of whole house retrofit projects may be, and in others a higher number of partial retrofits may be best, depending on cost and the nature of the homes in question.

**Public perception of retrofit may necessitate a different approach**: Low take up of national schemes to support retrofit (e.g. Green Homes Grant) and the experience of signing residents up to RA-H projects suggests that residents are reluctant to start retrofit on their homes. HPs could take a different approach by including retrofit work as part of ongoing renovations (e.g. new kitchens and bathrooms) rather than as a stand-alone activity. This will help to create a critical mass of take up that develops its own self-sustaining momentum.

**Dedicated innovation support is needed before whole house retrofit is proven to be commercially viable and able to deliver at pace and scale:** As part of the retrofit menu whole house and the Energiesprong approach will play a role. However more innovation support, supply chain building and market development is needed to bridge the gap from pilot to a viable mainstream solution.

## CONSIDERATIONS FOR THE FUTURE

Viewed purely as a pilot of full house retrofit RA-H has achieved what it set out to do. **RA-H performed well against ERDF output targets**. Successful projects are motivating HPs to pursue funding for future deep whole house retrofit activity. Residents' energy bills have been reduced by an estimated £1,249 per year helping to address fuel poverty whilst reducing carbon emissions.

However, some schemes had to proceed with higher costs and/or delays, including delays as redesigns were carried out to ensure that the original specification could be kept. Some beneficiaries had to increase their level of match funding to complete projects, which is not a sustainable finance model. Some projects have also seen large levels of resident dissatisfaction during the project due to disruption. Resident expectations were not always met, and in some instances, residents were told projects would last days and, at the time of writing, they have still not been fully completed. Getting residents to look beyond current disruption to the longer-term benefits of the improvements is a challenge that will prove to be easier to resolve when more tangible examples come onstream. The positive experiences and benefits reported by Enfield residents provide good examples for HPs to refer to.

Aside from progress towards ERDF output targets, objectives to drive a reduction in whole house retrofit costs, develop the supply chain, and achieve efficiencies of scale have not been seen as hoped during the ERDF-funded programme period. However, delivery is continuing beyond this period, production of panels is increasing in London (e.g. investment in Barking & Dagenham) and there are indications that SPs such as Equans are committing to higher volumes of ESUK retrofits around the UK. Similarly, RA-H has yet to prove a sustainable long-term business model to make whole-house retrofit viable for HPs providers and large numbers of homes. Evidence from the ongoing delivery RA-H will need to be reviewed before assessing whether Stages Three and Four will be feasible.

The need to reach London's net zero target is as imperative and decarbonising homes at pace and scale remains important. However, the financial risks to HPs and Local Authorities and the risk of disruption residents remain a challenge for whole house retrofit given current market conditions. Consideration should be given to whether innovation projects like RA-H are feasible but only once time has been given to see all benefits realised. Alternatives could be less resource intensive support to help HPs access funding and finance such as SHDF and the Mayor of London's Green Finance Fund. HPs who are keen to continue with whole house retrofit can then do so.

# ANNEX ONE: STAKEHOLDERS AND DELIVERY PARTNERS

| Name | Organisation |
|---|---|
| Austin Entonu | Head of Energy (GLA) |
| Sarah Fletcher | Programme Manager - Energy (GLA) |
| George Kokas | London Borough of Ealing |
| Rafe Bertram | London Borough of Enfield |
| Robert Kyle | London Borough of Hammersmith & Fulham |
| Gill Cox | London Borough of Haringey |
| Andres Shoman | London Borough of Harrow |
| Lillian Lochner | London Borough of Kingston |
| Paul Dunkerton | London Borough of Kingston |
| Tony Antonioni | London Borough of Waltham Forest |
| Mark Preston | ULS |
| Lee Whitby | Osborne |
| Tricia Valentine | Energiesprong UK |
| Justine Prain | Energiesprong UK |
| Ian Hutchcroft | Energiesprong UK |
| Ele George | Energiesprong UK |
| Matt Wood | Energiesprong UK |
| Alan Millar | Turner and Townsend |
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