# Making Performance-led Home Retrofit a Reality

Summary



### About MIMA

The Mineral Wool Insulation Manufacturers' Association (MIMA) is a trade body providing an authoritative source of independent information and advice on non-combustible glass and stone wool insulation. We represent leading mineral wool insulation companies in the UK, promoting the benefits of mineral wool insulation and the contribution it makes to the energy efficiency of buildings and the comfort, health and safety of their occupants.

MIMA has a long-standing record of conducting research, advocating for policy, and developing high-performing mineral wool insulation systems which support the retrofit industry in closing gaps in performance between the design intent of energy efficiency measures and their actual performance in use.

#### Disclaimer

All examples, case studies, and references used in this paper were accessed prior to 16 January 2025 and have been used for illustrative purposes only. They are not an endorsement by MIMA of the commercial offers or approaches to building retrofit quoted. See the Annex for definitions of terms used in this summary.



### Introduction

In February 2025, MIMA published a detailed discussion paper: Making Performance-led Home Retrofit a Reality. The paper makes seven recommendations for UK policy and industry standards, geared towards building strong consumer trust and confidence in home retrofit as we transition to Net Zero. It also discusses insulation's important role within our framework, and within the context of the electrification of home heating.

This summary provides an overview of the full report, setting out our:

1. Guiding principles and overall 'ask'	4
2. Rationale for change	6
3. Seven recommendations for a Performance-led Home Retrofit framework	10

We welcome the views of policymakers and colleagues on the issues raised and the recommendations made.

# 1. Guiding principles and overall 'ask'

Consumer trust and confidence in home energy upgrades is key to getting the UK's housing stock to Net Zero.

To build strong consumer confidence and to 'take people with us' on this transition, the insulation, energy efficiency, and clean heat sectors need to work closely together to ensure we achieve reliably good, proven outcomes for customers when retrofitting their homes.

If we, as an industry, can commit to checking, verifying, and increasingly guaranteeing aspects of building performance as the housing stock is decarbonised, we take many of the real or perceived risks of the transition off the shoulders of householders and onto ourselves. We can better assure customers of a positive retrofit experience and a great outcome, ensuring the energy savings and emissions reductions aimed for are realised, and people's homes are comfortable, healthy, and safe to live in.

To achieve this, MIMA is calling for policy and standards to evolve so that by 2030:

- Measuring key aspects of home energy performance has become the norm. All UK households getting a home fabric and/or clean heat upgrade should be able to opt for a service from their Retrofit Provider which includes checks of the actual performance of the fabric and clean heating system, pre- and/or post retrofit as appropriate, using accredited methods, technologies, and forms of monitoring.
- An ever-growing number of households can benefit from 'Outcomes-Based Guarantees'. Widespread and routine checks of fabric and heating system performance will enable and encourage more Retrofit Providers to innovate with market offerings we are calling Outcomes-Based Guarantees. These are optional contracts with customers whose terms assure or guarantee certain outcomes from a home upgrade, such as a specified minimum heating system efficiency or agreed energy saving in kWh.<sup>1</sup>

This approach to delivery is based on a simple set of guiding principles:

### 1

Moving to a national policy framework in which Retrofit Providers are supported in routinely testing and checking how homes perform in practice once they are upgraded...

# 2

Enables and encourages more companies to innovate to bring forward guarantees related to certain outcomes of retrofit projects, such as guaranteeing quantified reductions in home heating demand... 3

Which helps to grow consumer trust and confidence in home energy upgrades and support for Net Zero buildings more generally.

<sup>&</sup>lt;sup>1</sup> Outcomes-Based Guarantees are different to existing guarantees concerned with protecting

consumers by rectifying any problems or 'defects' found with a given installation. See Page 50 of the full report.

Fortunately, we are now in an era where an increasing number of relatively low-cost,<sup>2</sup> low disruption technologies and methods exist to measure how homes actually perform in terms of their heat demand, energy use, and emissions. This means Retrofit Providers and their customers no longer need to rely solely on modelled estimates which can differ significantly to measured results.

For instance, it is now possible to measure the heat loss of a building relatively rapidly without the occupants having to move out, using Smart Meter Enabled Thermal Efficiency Ratings (SMETER) technologies.<sup>3</sup> It is also possible to have a heat meter installed with a heat pump to allow its real-time and average yearly efficiency to be checked, interfacing easily with a homeowner's smart phone or tablet.<sup>4</sup>

Such technologies open the door to all kinds of exciting Outcomes-Based Guarantees. For example:

- Heat Geek already guarantees the "overall efficiency" of the heat pump systems fitted by their engineers.<sup>5</sup>
- Knauf Energy Solutions recently guaranteed an agreed level of energy demand saving in kWh (assessed under standardised conditions) for a social housing retrofit project of 166 homes in Belgium.<sup>6</sup>
- Octopus Energy offers the "Octopus Zero Bills" guarantee for new build homes, which may, down the line extend to any home which meets their specification.<sup>7</sup>

#### Guaranteeing heating bill savings

By routinely checking the actual, in use performance a home fabric upgrades and heat pump system efficiency we support Retrofit Providers in coming forward with pledges or guarantees to 'meet or beat' the running costs of a household's previous fossil fuel heating system, guaranteeing bill savings, and helping to de-risk delivery.

"There is broad consensus and support for this clean energy transition...We have to make this work financially for people. That is the absolute pre-condition of taking people with us...Think about heat pumps...take up is up...but this only works if we can say to people, you can replace your boiler with a heat pump, and it won't cost you more. If we're saying to people we're going to come along and charge you £1,000s extra we're just not going to take people with us on the transition. That is my strong view...That is why our Warm Homes Plan is important." *Rt Hon Ed Miliband MP, Secretary of State for Energy Security and Net Zero, 15 January 2025*<sup>8</sup>

<sup>&</sup>lt;sup>2</sup> Fabric tests range in price but start at the low fhundreds and are likely to aggregate around this price point or lower if the market is driven at scale.

<sup>&</sup>lt;sup>3</sup> See Section 4 of the full report. MIMA welcomes recent UK policy proposals to utilise SMETERS in ECO4 and the Great British Insulation Scheme 'pay for performance' provisions, and as part of EPC reforms.

<sup>&</sup>lt;sup>4</sup> Should a significant discrepancy between the expected and actual performance arise, additional tests may be needed to find the cause and further work carried out to rectify any issues.

<sup>&</sup>lt;sup>5</sup> See <u>Homeowner Agreement</u>

See <u>CaseStudies</u> (All) | KES Site

<sup>&</sup>lt;sup>7</sup> See <u>Making Zero Bill homes the new normal | Octopus Energy | Octopus Energy</u>

<sup>&</sup>lt;sup>8</sup> See (10) Post | LinkedIn

## 2. Rationale for change

#### The importance of public trust and confidence

"We're undoubtedly at one of the most critical turning points for humanity. Our research shows that consumers are up for the challenge and want to adopt more energy efficiency changes at home. We need to harness that willingness. By developing public trust and confidence, adoption of energy efficiency measures can become mainstream. Only then can the UK achieve its green transformation." *Nesta, 2021*<sup>9</sup>

The UK has made solid progress raising the energy performance of homes over the last 20 years. However, many people's properties will still require significant upgrade work to reduce their energy use and to decarbonise their heating.

We no longer have the luxury of time. There needs to be substantial progress on upgrading homes over the next five years to deliver on the Government's pressing targets to eradicate fuel poverty, cut energy bills, meet carbon budgets, and to support the electrification of heat – a major infrastructure project in itself.

There are three systemic issues we must tackle to deliver on these objectives, in a way that assures the outcomes householders and the country needs:

- Issue 1: Lack of drivers for routine checks of actual home energy performance
- Issue 2: Policies assume 'perfect' performance
- Issue 3: Fragmented policy frameworks supporting insulation and heat pump delivery

#### Issue 1: Lack of drivers for routine checks of actual home energy performance

The energy efficiency industry has made significant improvements to quality assurance frameworks underpinning home upgrade polices and funding schemes over the last decade, and must continue this vital work. A major missing piece exists: the routine measurement, metering, and monitoring of a property's performance following an upgrade to check it is in line with the design, and that the householder is getting the planned performance. Such checks are not usually a standard part of retrofit projects, despite barriers to action falling away.

For example, as things currently stand, Retrofit Providers are required to design insulation upgrades to achieve a specified 'U-value' to meet building regulations. Official guidance then lays out how to do the insulation work in the right way, and compliance with the regulations is demonstrated through modelling surveillance of installations in some cases. But regulations do not yet require, or even strongly encourage, anyone to verify that the intended performance has been achieved in practice, or that given outcomes such as estimated reductions in space heating demand have been realised.<sup>10</sup>

<sup>&</sup>lt;sup>9</sup> See <u>decarbonisinghomes.pdf (nesta.org.uk)</u>

<sup>&</sup>lt;sup>10</sup> As noted in footnote 3, recent government proposals show promising progress in this area.

The same is true of policy frameworks driving the transition to clean heat. The Government's flagship Boiler Upgrade Scheme, which supports the installation of heat pumps, does not, for example, include any requirements for installers to check or monitor the actual efficiency of the heating system once it is up and running. This matters because actual, in use efficiency of heat pump systems makes a big difference to a household's heating costs.<sup>11</sup>

#### Issue 2: Policies assume 'perfect' performance

Current processes rely on modelling to demonstrate compliance with standards, with energy models and associated policies tending to assume 'perfect' performance of measures once installed.

However, fabric performance is highly sensitive to the quality of insulation and other installation work. Failure to use the right insulation in the right quantity, and not properly addressing gaps in the insulation layer and thermal bridges, can significantly reduce its performance, raising heating demand. For instance, if walls are fitted with insulation boards where gaps have not been properly sealed the real heat loss from the property may be worse than calculations predict, particularly in exposed windy locations.

Insulation may also have been assumed to be present for an Energy Performance Certificate assessment, and counted as reducing the home's heat loss, but is found to be missing once a more detailed inspection is performed.

The degree of 'performance gap' differs between properties, with some homes performing extremely well in practice, but studies suggest actual heat loss from buildings can be more than 50% worse than the design value.<sup>12</sup>

Similarly, for heat pumps, new research demonstrates that efficiency levels are rising overall, now reaching roughly three times the efficiency of a standard gas boiler. However, a major study suggests the actual efficiency of systems once installed is often lower than the estimated performance.<sup>13</sup> Another new study also highlights a significant gap between measured "in-situ" efficiencies and the forecasts made by installers, with 38% of the Air Source Heat Pumps in the sample found to have Seasonal Performance Factors of less than 2.5 – while all forecasts were above 2.5.<sup>14</sup>

Nobody can expect perfect performance every time, but it is important to tackle the issue head on as significant performance gaps can:

 Cause high heating bills. Performance gaps mean heating bills will be higher than predicted. After fitting an electric heat pump, in many scenarios, energy bills can be expected to fall.<sup>15</sup> However, when switching from a gas boiler the situation is less clear cut, due to the high cost of electricity compared to gas, and despite the superior efficiency of heat pumps. Performance gaps exacerbate the problem, potentially resulting in heating bills rising rather than falling. This is a poor outcome, and especially so for households in fuel poverty and on low incomes where every pound saved is critical.<sup>16</sup>

<sup>&</sup>lt;sup>11</sup> For example, see <u>Quantifying the domestic building fabric 'performance gap' - Leeds Beckett Repository</u>

<sup>&</sup>lt;sup>12</sup> Section 4 of the main report stresses that action on three determinants of space heating costs: heating demand, heating system efficiency, and energy unit prices, is needed to permanently lower bills.

<sup>&</sup>lt;sup>13</sup> See Electrification of Heat Demonstration Project

<sup>&</sup>lt;sup>14</sup> See <u>rbandm-research-project.pdf</u>

<sup>&</sup>lt;sup>15</sup> See <u>Air source heat pumps: costs, savings and benefits - Energy Saving Trust</u>

<sup>&</sup>lt;sup>16</sup> See (1) 'Low-energy' new homes – the cost of getting them wrong! | LinkedIn

- Result in incorrectly sized heat pumps. If a home's measured heat loss is much worse or much better than the losses estimated in models, then a heat pump selected on the basis of those calculations may not match the home's heating needs. Although there is often lee-way built in, guidance by the Microgeneration Certification Scheme makes clear that "sizing the heat pump correctly is of paramount importance."<sup>17</sup>
- Increase pressure on the electricity grid. The electricity grid is being decarbonised at pace and massive investment will be made into grid expansion and reinforcement to support future increases in electric heating and electric vehicles. Insulating homes well to reduce their heating demand is crucial for keeping down expansion costs and meeting peak heating demand. This is illustrated well by NESO's Future Energy Scenarios in which around an 80 TWh (roughly one-third) drop in residential heating demand is assumed as a result of insulating."<sup>18</sup> If these savings aren't realised, and realised in practice, the extra unanticipated pressure on the grid would be significant. Routine checks and verification of home energy performance helps to de-risk the electrification agenda and improve energy security one home at a time.

#### Issue 3: Fragmented policy frameworks supporting insulation and heat pump delivery

The Government's main funding schemes for insulation and fabric improvements, and those providing funding for clean heat, are tending to drive the installation of one of these types of measure or the other. Insulation or heat pumps. With installers usually trained in fitting one or the other.

Again, this matters because putting a very efficient heat pump into a well-insulated home should mean:

- Very low heating bills. Annual heating costs for an average-sized house could be over £800 lower when the home is well-insulated, the heat pump efficiency is above-average, and the household opts for a specialised, reduced heat pump tariff, when compared to a potentially 'standard' scenario.<sup>19</sup>
- A smaller capacity heat pump system may be possible. As upgrading home insulation lowers space heating demand, a Retrofit Provider fitting a heat pump in such a property may be able to specify a smaller, lower-cost system, potentially with fewer radiator replacements. The upfront cost of the system may be fhundreds or even fthousands less. This saving would partially or potentially fully off-set the cost of the insulation work, especially when installing simple loft and cavity wall insulation.

<sup>&</sup>lt;sup>17</sup> See <u>Heat-Pump-Guide.pdf</u>

<sup>&</sup>lt;sup>18</sup> See <u>download</u>

<sup>&</sup>lt;sup>19</sup> See Page 30 of the full report for more detail on this calculation.

#### Can basic insulation pay for itself with a smaller heat pump system?

"If you have low-cost insulation measures that can be implemented then these are a sensible first step in a full retrofit, including to EnerPHit, in part because this sometimes removes the need to upgrade radiators. With cavity wall insulation costs for a modest house around £1k, this could pay for itself in unneeded new radiators and a smaller heat pump." *Passivhaus Trust, 2024*<sup>20</sup>

The Government's latest wave of the 'Warm Homes' programme, which includes the Local Grant and the Social Housing Fund, is moving in a helpful direction in this respect. The latter requires that "bills must not increase" as a result of the retrofit work carried out under the Scheme. Part of the programme requires the installation of low carbon heating systems, and project teams are also expected to install energy efficiency measures such as solar PV or insulation to help ensure bills do not go up.<sup>21</sup>

MIMA strongly believes we need both fabric measures and clean heat working together in homes, alongside efforts to lower electricity unit prices, to give consumers the best possible outcome for the long-term.<sup>22</sup> This means Retrofit Providers proactively spelling out and quantifying the important benefits of doing insulation and heat pump upgrades at the same time to customers, where appropriate, so they can make informed choices.

It is widely recognised that the deployment of heat pumps needs to ramp-up significantly and fast so the UK can get on track to meet emissions reduction targets. However, we must be careful not to reduce ambition on home insulation, or to de-couple delivery, especially for fuel poor households.

We suggest that a pragmatic policy approach to joining-up fabric and clean heating upgrades in the short-term is to first proactively target low carbon heat deployment in the many millions of UK homes that already have reasonable or good levels of insulation and heat demand, so there is no delay in heat pump roll-out. This approach also buys time to focus on getting poor performing homes better insulated – both cavity and solid wall - with those in fuel poverty as a high priority.

#### The importance of insulating homes with fuel poor occupants

"Tackling fuel poverty among fuel poor households requires a fabric first insulation approach, completing these programmes for all fuel poor and vulnerable households, before resources are directed at the incorporation of low-carbon heating systems into those properties." The "best path toward sustainability for low-income households has to be a fabric first – insulation, insulation, insulation – approach." The Committee on Fuel Poverty, 2024<sup>23</sup>

<sup>&</sup>lt;sup>20</sup> See <u>The Right Time for Heat Pumps | Passivhaus Trust | April 2024</u>

<sup>&</sup>lt;sup>21</sup> See <u>WH:SHF Wave 3 Scheme Guidance</u>

<sup>&</sup>lt;sup>22</sup> MIMA's paper focuses specifically on the links between low carbon heating systems and fabric improvements, recognising this should sit within a wider whole-house approach to retrofit. See the Annex for more details.
<sup>23</sup> See <u>Can Fuel Poverty be Ended? The Committee on Fuel Poverty Annual Report 2024</u>

## 3. Seven recommendations for a Performance-led Home Retrofit framework

MIMA's vision and solution to the issues raised is for policy frameworks and industry standards to proactively support the industry in guaranteeing certain outcomes of retrofit projects.

Such Outcomes-Based Guarantees would be:

- Supported by the joint delivery of fabric upgrades and clean heat in homes, where suitable and appropriate; and
- Enabled by making fabric testing, and metering and monitoring of heat pump performance, a routine part of the customer journey.<sup>24</sup>

Being able to reassure, guarantee, and prove to a homeowner that they will get a good retrofit experience with a positive outcome is a game-changer, and naturally generates consumer trust and confidence in the process. It also delivers important benefits for the country as a whole:

- **Guaranteed heating bill savings for consumers.** Guarantees, for instance, "that bills will not rise" when switching to a clean heating system means householders can feel confident they will realise this result.
- Guaranteed improvements in housing conditions and health outcomes. Good insulation, working as intended, can make a home healthier and safer. Guaranteeing energy savings and/or 'comfort', for example, ensures fuel poor households and those living in sub-standard housing get genuine, verified improvements.
- **Guaranteed energy demand savings.** Verification of actual heat demand reductions, made one property at a time, adds up to improved energy security.

And for the retrofit industry more generally, if we routinely check aspects of home energy performance and begin to guarantee our installations 'do what they say on the tin', this will have many business and reputational benefits.

Below, MIMA lists seven recommendations on these themes, with detailed analysis and explanation set out in our full report: Making Performance-led Home Retrofit a Reality.

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<sup>&</sup>lt;sup>24</sup> Using accredited methods and technologies, with ever-improving accuracy. See Section 4 of the full report.

**Recommendation 1:** Government to set an aspirational Target in the Warm Homes Plan to make measuring, metering, and monitoring of home energy performance the norm.

Detail: Government to set a Target in the Warm Homes Plan that by 2030 all UK households getting a home fabric and/or clean heat upgrade will be able to opt for a service from their Retrofit Provider which includes checks of the actual performance of the fabric and clean heating system, pre- and/or post retrofit as appropriate, using accredited methods, technologies, and forms of monitoring. Relevant industry standards would require Retrofit Providers to demonstrate that an offer to measure, meter, or monitor the fabric and/or the heating system has been made to customers.

Rationale: The new government creates a truly world-leading retrofit framework based on measured performance, helping to re-invigorate consumer appetite for and trust in home energy upgrades and energising the supply chain to come forward with innovative and exciting Outcomes-Based Guarantees.

**Recommendation 2:** Government schemes to incentivise the measurement, metering, and monitoring of home fabric performance and clean heating systems, moving towards making this mandatory in government funded energy efficiency programmes.

Detail: To support Retrofit Providers in bringing forward more measurement, metering, and monitoring of building energy performance in the short-term, and to make headway on MIMA's proposed 2030 Target, government should proactively incentivise checks of home fabric performance and clean heating systems, including by:

- Expanding 'pay for performance' policies such as that being consulted for ECO4.25
- Updating EPCs to include the capacity for assessors to input measured data collected on a building's fabric performance, and potentially other measures, to improve the accuracy of the EPC rating, plus new metrics to drive such measurement, including an Actual Fabric Energy Efficiency (AFEE) rating.<sup>26 27</sup>
- Developing policies based on concepts which place a value on the energy we do not use,<sup>28</sup> in addition to policies we already have to increase energy supply, and particularly renewable energy.

Rationale: Incentives and rewards can trigger more and a wider range of performance testing approaches and Outcomes-Based Guarantees, greater innovation, and better outcomes for consumers sooner rather than later, without forcing a one-size-fits-all approach.

<sup>&</sup>lt;sup>25</sup> See Energy Company Obligation 4 and the Great British Insulation Scheme: mid-scheme changes - GOV.UK

<sup>&</sup>lt;sup>26</sup> The government's current consultation on EPC Reform includes proposals on this topic. See <u>Reforms to the Energy Performance of Buildings regime - GOV.UK</u>

<sup>&</sup>lt;sup>27</sup> See Box 21.

<sup>&</sup>lt;sup>28</sup> Sometimes referred to as 'Negawatts'. See <u>Kickstarting\_negawatts.pdf</u>

**Recommendation 3:** Government to set a framework for the accreditation of methods and technologies used for fabric testing and heat metering and require that accredited approaches are used by Retrofit Providers.

Detail: As a minimum, fabric performance testing and heat pump heat metering offered by Retrofit Providers to customers as part of a home upgrade in pursuit of the 2030 Target, must use accredited methods and technologies, as defined by the Government in consultation with industry, and which includes requirements relating to accuracy, referencing existing standards as appropriate.

Rationale: Fabric testing and heat metering are critical enablers of a successful transition to a Net Zero building stock, meaning consumers can feel confident they are getting the performance they paid for. Both forms of monitoring are now possible at reasonable cost and minimal disruption and these tests are already underpinning existing Outcomes-Based Guarantees. It is essential testing technologies perform in line with agreed parameters.

**Recommendation 4:** Retrofit Providers should fit the smallest heat pump system possible, enabled by measuring the home's actual heat loss and improving the building fabric where appropriate.

Detail: Industry standards should seek to ensure that Retrofit Providers are specifying the smallest heat pump system possible to achieve desired internal temperatures, in order to potentially reduce up-front and running costs for the consumer. This goal is enabled by improving the building fabric, where appropriate, especially if the home's heat loss is high, and by measuring the fabric's actual performance.

Relevant industry standards should require Retrofit Providers to record for a household what steps will be taken to reduce the size of their heat pump system, including insulating.

Rationale: The smaller the size/capacity of the heat pump system needed, the lower the energy consumption, and the lower the upfront and running costs are likely to be.

**Recommendation 5:** The Warm Homes Plan should target all three determinants of space heating costs together: heat demand, heating system efficiency, and energy unit prices, to reliably and permanently reduce energy bills.

Detail: The Government can drive down home heating costs for all, for good, by acting on all three determinants of space heating costs in tandem: heat demand, heating system efficiency, and energy unit prices.

Rationale: This approach also helps to de-risk building decarbonisation policy by ensuring no single element of the 'Affordability Equation' is overly relied on to lower people's energy bills, and helps the Government to meet its manifesto commitment.

**Recommendation 6:** Consumers should be advised by Retrofit Providers to insulate their homes, where appropriate, before or when having a heat pump fitted, and be fully informed of the benefits of doing so.

Detail: Heat pump customers whose homes lack wall insulation, and the full complement of loft insulation should be advised to get this insulation done where possible, checking the home's technical suitability for the measures first. The advice should include an assessment of the additional benefits insulating could deliver, including additional predicted energy savings and fuel bill reductions.

Rationale: This recommendation supports the achievement of many UK policy objectives, including tackling fuel poverty by 2030, improving housing conditions, health and wellbeing, meeting carbon budgets, improving energy security, and taking the pressure off the electricity grid.

**Recommendation 7:** Consumers should be given an indication of their home's 'readiness' for low carbon heat on the EPC, linked to a metric on the actual fabric performance.

Detail: Future EPCs should include an indication (but not a definitive statement) of a home's 'low carbon heat readiness', linked to and enabled by our proposed new fabric performance metric: an Actual Fabric Energy Efficiency (AFEE) level, described in Recommendation 2 and on Page 13.

Rationale: Research suggests that the vast majority of homes will be suited to a low carbon heating system, such as a heat pump, but some will need more work than others to prepare them. A new EPC indicator should trigger the switch to clean heat as soon as possible for homes that are already genuinely 'ready'.

#### Annex - Our focus

The focus of this summary and MIMA's full paper is on the links between building fabric performance and low carbon heating systems such as heat pumps, in existing UK homes. It is not a technical paper. The goal is to set out high-level policy proposals for the Government and for industry to help secure good, assured outcomes for consumers when upgrading these aspects of their homes.

By 'fabric performance' we mean how well a building retains heat due to the level of insulation, the quality of the glazing and doors, and improvements in general air tightness. References to 'heat pump' usually mean a low-temperature Air Source Heat Pump (ASHP), but the principles and proposals discussed should apply to any form of low carbon heating system which uses electricity. SCOP is the Seasonal Coefficient of Performance, and SPF is the Seasonal Performance Factor.

'Retrofit Provider' means a person or company contracting with a customer to carry out work to a property to improve its quality, energy, and carbon performance. Retrofit Provider also refers to sub-contractors carrying out home upgrades, including installers. It is not a legal term.

'Customer' means a person or organisation contracting with a Retrofit Provider. Hence, customers will range from private homeowners and landlords upgrading a single property, through to organisations commissioning large-scale retrofit projects, such as a social housing provider.

We would also like to make clear that although this paper focuses on low carbon heating systems and fabric improvements, best practice is that these measures sit within a whole-building approach to retrofit, for example, as set out in PAS 2035:2023.<sup>29</sup> Broader aspects of retrofit delivery remain critical, such as performing a technical building assessment to check for the suitability of measures and ensuring a home is adequately ventilated.

In addition, our proposals on measuring, metering, and monitoring of fabric and heat pump performance also fall within a broader Building Performance Evaluation context, recognising that measuring and metering provides valuable information about whether a building is performing well, but that if problems are uncovered, further diagnostic and remedial works could be needed. Test methods and tools need to be sufficiently reliable and forensic to accurately identify the cause of any potential shortfalls in building performance to avoid the potential for energy efficiency measures being incorrectly seen as under-performing if, in fact, it is due to other causes. See more in Section 4 of the full report.

Lastly, MIMA's recommendations are intended to encourage Retrofit Providers to come forward with an ever-growing range of market offerings which we are calling Outcomes-Based Guarantees. Different to existing guarantees concerned with protecting consumers by rectifying any problems and defects found with a given installation, Outcomes-Based Guarantees are optional contracts with customers whose terms assure or guarantee certain outcomes of a home upgrade such as an agreed energy saving in kWh (assessed under standardised conditions) or heating system efficiency. See Section 3 of the full report.

<sup>&</sup>lt;sup>29</sup> See pas\_2035\_2023.pdf (bsigroup.com)



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