

MEANINGFUL MEASUREMENT IN SOCIAL HOUSING PROPERTIES



Introduction

Social housing providers are purpose-driven organisations. Whether it is social, economic or environmental outcomes, the sector is good at thinking beyond its core remit of providing affordable housing, appreciating the bigger picture and driving added value.

One of the biggest challenges for the sector is decarbonising the managed housing stock. This goes beyond just helping our environment. It is about improving the quality of life and safety of residents, ensuring resilience, managing risk and ensuring long-term property affordability.

With resources, funding and expertise scarce, the need to get it right the first time is essential. But, without accurate data, the chances of meeting this decarbonisation challenge successfully are slim.

The purpose of this guide is to help social housing providers go beyond seeing measurement as a tick-box exercise to satisfy funding requirements or regulations.





Divided into three sections, this guide covers:

1. EPC ratings – do they go far enough?
2. Property performance – you can't manage what you don't measure
3. Being proactive – why issues like mould must be tackled early

Measurement is the only way of ensuring that the investment in net zero social housing is well-targeted and delivers the desired outcomes. Only with an accurate understanding of housing stock can we target resources, successfully specify works and drive an innovative culture that promotes continuous improvement in the industry.

1.

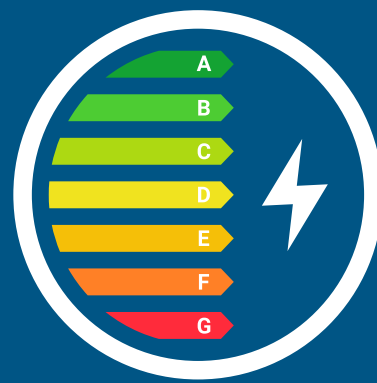
EPC ratings - do they go far enough? —

Traditionally, the social housing sector has taken a reactive repair and replace approach, updating asset records on an ad hoc basis.

The most common method of surveying buildings has been simple visual inspection. For example, most EPC ratings are based on an assumed level of performance. No matter the skill or experience level of the assessor or surveyor, the true extent of air leakage or thermal bridging simply cannot be determined visually.

Our own research, in partnership with the Energy Saving Trust on behalf of the Department for Energy Security and Net Zero (DESNZ), has found that EPCs only predict the thermal performance of a building correctly in 44% of cases.¹

The disconnect between fuel poverty and EPC ratings also supports this claim. While a property might visually look to be in a good state of repair, it is what is underneath that can cause unexpected thermal performance issues. The result is a property that is hard to heat, greatly impacting residents' costs and their living conditions.



Going beyond regulations

While not bound by legislation, like the Minimum Energy Efficiency Standards enforced upon private landlords, social housing providers must proactively seek to invest in their housing stock and create better living conditions for their residents.

To eradicate fuel poverty and deliver carbon neutrality, properties must be affordable to run and have minimal environmental impact over their operational lifecycle.

The social housing sector is setting stretch goals for itself around EPC ratings and resident satisfaction scores. These are imperfect yard sticks that change with time. Instead, SMART objectives should be based on directly measurable parameters that can be linked directly to the headline strategic objectives of the business.

¹The Value of In-Use Building Performance Metrics on the route to Net Zero, DESNZ, 2023

Data's role

The success of a multimillion-pound social housing project investment is often based on regulatory sign-off, improved EPC ratings and positive resident satisfaction survey responses. These survey methods, while offering some benchmarking, are highly subjective and anecdotal. Reliable, quantifiable data is needed to verify the true impact of spend.

Example SMART parameters that housing stock owners have control over include:

- Heat loss (W/K)
- Mould risk (0-100)
- Overheating risk (0-100)
- Airtightness (m3h/m2)
- Air quality (CO₂, PPM, VOCs)
- U-values (W/m²K)



Without data insights, social housing providers can be unsure about how:

- Best to prioritise limited resources
- To validate the delivered outcomes
- To prove if a project has met the desired goals.

Such proactively measured accurate and specific insights are often overlooked or at best simply seen as a checkbox requirement for compliance purposes. This is partly down to a misconception that the measurements are difficult and expensive to obtain. It is also due to a lack of understanding about how measurements relate to strategic objectives, such as reducing CO₂ emissions, lowering fuel bills and tackling fuel poverty.

By carrying out thermal performance measurements and air leakage tests, a social housing provider and its contractors will take a “right-first-time” approach to retrofit. The housing provider can use data to directly determine the most cost-effective retrofit solutions that offer the best return on investment while making the most impact on tenant’s lives.”

Luke Smith, managing director at Build Test Solutions

The financial strains on social housing providers force them to constantly re-evaluate their priorities and retrofit investments. Without data, onward investment into improving property thermal performance and comfort is more challenging.

With the increased adoption of IoT, smart thermostats and other internet-connected appliances that can share useful performance data from our buildings, getting this information is becoming much easier. Making assumptions is no longer necessary.

2.

Property performance - you can't manage what you don't measure

Know your terms:

- **Modelling** - currently the mainstream approach in the industry where non-invasive observations are made about the construction of a building. These parameters are input into a model such as SAP or rdSAP to produce an EPC.
- **Measurement** - measurements taken of physical characteristics of the home. This includes the thermal performance of the building to determine its heating and ventilation requirements.
- **Monitoring** - semi-permanent sensors in homes, continuously monitoring live conditions, such as internal temperature, relative humidity and air quality.

Each of these activities can be used to support one another and none should be used in isolation, although this is often the case.

Accurate measurements of the actual thermal performance are rarely taken.

Without these insights, social housing providers can be left in the dark about how to prioritise limited resources. Proving the success of the project can be challenging and currently, social housing providers cannot definitively prove if a retrofit investment has met the desired goals.

This is where proactive SMART measurement comes in.

Measuring baseline performance

Measurement before retrofit investments are made provides an invaluable indicator of the baseline thermal performance level.

By having a provable measured baseline, rather than an assumed performance level, social housing providers can use data to:

- Compare properties
- Assign funding to the homes in greatest need
- Ensure prioritisation of the lives of the most impacted residents, rather than those who shout the loudest or have the lowest EPC rating.

Accurate measurement also showcases the problem areas of each property.



For example:

A social housing provider only has limited resources to invest in properties. They use data from their properties to make more informed decisions. Data allows them to assess what the most cost-effective and impactful solutions are, rather than having a blanket approach of installing the same specification insulation and heating solutions across all properties or archetypes.

Measuring delivered outcomes

Measuring the success of a project occurs in two ways:

- After retrofit to carry out an accurate data comparison against pre-retrofit measurement data
- Once a new build has been completed to compare it against the design intent

These comparisons provide evidence about the true impact of the investment and whether the desired outcomes have been achieved.

Measurement is the only way to evaluate the effectiveness of the original specification of works and how the contractor has delivered this.

Measuring before and after work provides credibility with funding providers, lenders, investors and regulators. Without quantifiable success, investments could be reduced, and residents could suffer.

Taking measurement further

Measurement is critical to maintaining investment in net zero housing.

There's never a one-size-fits-all solution. Measurement is key to tailoring social housing association's approach to retrofit and new build construction."

Luke Smith

Measurement allows social housing providers to work with their supply chain to specify the right solutions and products and prove the quality of the products and workmanship from day one. In the long run, this process will save money by rectifying issues early and ensuring project goals are met.

Measurement can also show residents that the social housing provider is dedicated to providing high-quality, low-energy homes. Showcasing the investment and actual energy performance of a specific property will make residents happier with their homes and highlight the cost and comfort benefits they can expect.

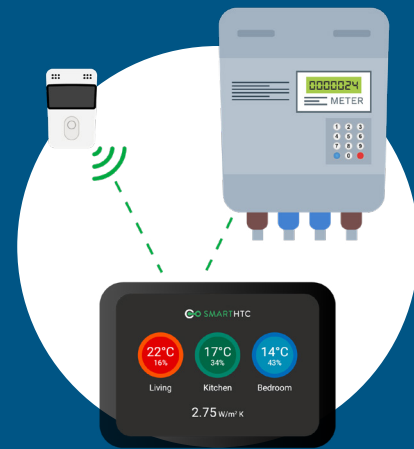
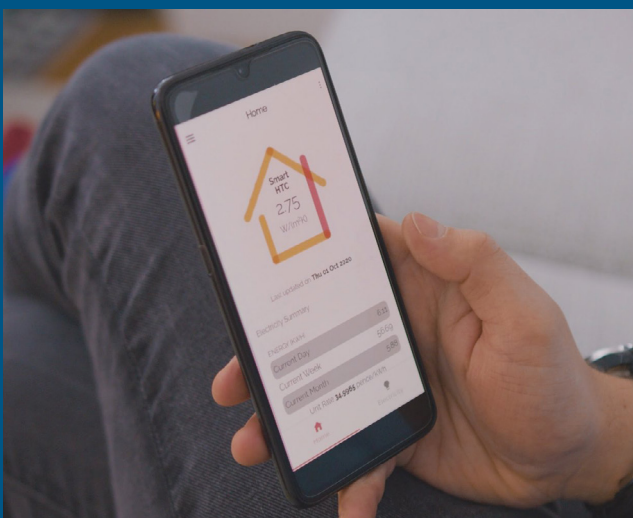


Selecting the right approach

There are a range of different data acquisition approaches that may be adopted, so choosing the ones that provide the greatest insights and benefits is key.

The most common solution is a survey and modelling approach. Visual observations are made about a building and these are used to estimate the likely performance of the property in question. This process is relatively quick but fails to fully represent actual building performance.

Measurement of the individual building performance parameters can enhance visual inspections, without adding significant costs.



SmartHTC

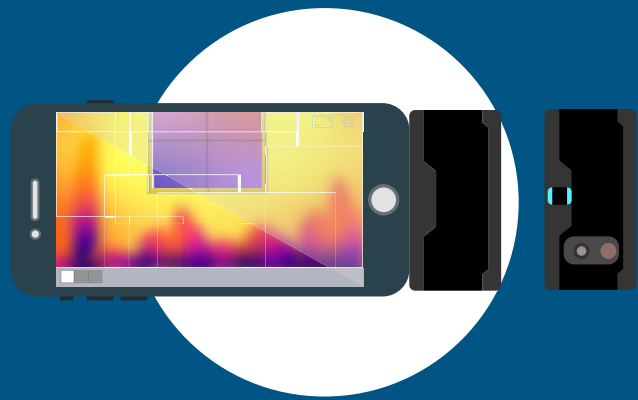
Measurement of the heat transfer coefficient (HTC) of a property provides a measure of the overall effectiveness of the building envelope and its insulation. Build Test Solutions' (BTS) SmartHTC method allows measurements to be obtained while a property is used to determine if further insulation is needed. SmartHTC can also measure the peak heat demand (kWp) of a property, proving the suitability of a heat pump or alternative low-carbon heating system being installed.

Mould risk can also be determined by SmartHTC, allowing the issue of mould and condensation to be identified before the problem manifests or causes lasting damage to the property or health issues for residents.



Pulse

Air permeability tests, like Pulse, provide an air leakage rate measurement representative of normal inhabited conditions. This helps to improve understanding of energy performance and provides a much-improved understanding of background ventilation rates. Pulse can be used in occupied homes and inform what interventions and strategies should be used to reduce unwanted air leakage and improve ventilation.



Heat3D

U-value measurement provides an accurate understanding of heat flow and U-values across a whole surface. They can help understand where insulation is needed or where it has failed in a property. Build Test Solution's Heat3D system uses infrared thermal imaging to obtain a measured U-value result in one hour. It presents U-value measurements across an entire thermal element, rather than just measuring the U-value of a single point, as per incumbent methods.

Getting accurate and insightful measurement data can transform the social housing landscape for the better.

Survey techniques are fast evolving as the capability to deploy low-cost sensors and use data from smart meter infrastructure increases.

It's critical that the industry gets useful information from this data to support and validate the industry's sustainability efforts.

3.

Being proactive - why issues like mould must be tackled early

Measuring properties during the building or retrofit process is important, but ongoing proactive measurement and maintenance is also vital.

The BRE Trust, an independent charity dedicated to improving the built environment, estimates that **poor housing costs the NHS £1.4 billion a year to treat those affected.**

One of the biggest issues is mould. Formal complaints to the ombudsman about damp, mould and leaks are expected to reach 5,300 for the year, up from fewer than 2,000 in 2020-21.

The issue is being exacerbated by high fuel costs, which are leading residents to turn off their heating to save energy – increasing the risk of mould as moisture builds up within properties.



Causes of mould

Mould can be caused by many overlapping factors, including property humidity levels, temperature and ventilation.

Moisture can be created internally from:

- Showers
- Cooking
- Airdrying clothes

It can occur externally from:

- Rain
- High humidity

An estimated 36 million people in Europe could not keep their homes adequately warm in 2020, which can create perfect mould spore conditions. Poor ventilation can also lead to an inability to expel excess airborne moisture and pollutants, further exacerbating risks.

Mould's impact on health

Mould can emit spores, cells, fragments and “volatile organic compounds”. These spores can break free and cause respiratory problems, such as asthma, and can exacerbate underlying health conditions, with fatal consequences. Removing carpets and painting over the issue doesn't address the root cause, and neither does just adding more ventilation.

About **450,000 homes in England** were found to have problems with condensation and mould.

This figure triggered calls from paediatric doctors to monitor and report on air quality problems in homes. Awaab Ishak, the two-year-old boy who died from chronic exposure to mould in his flat, is an unfortunate example of the devastating impact of mould in social housing properties.

Finding mould

Commonly, mould is only found when the visual impact is seen and reported by residents. However, social housing providers no longer need to rely on reactive reports or periodic visual inspections, both of which leave much to chance. Proactive acquisition of data can spot the increased mould risk of a property before issues even occur.

Powerful insights can be obtained from our mould risk indicator algorithm. BTS' SmartHTC assesses the mould and condensation risk of a building, providing live overall and individual room risk scores”

Luke Smith

Low-cost non-invasive temperature and relative humidity loggers, similar to SmartHTC, can provide the data needed to determine mould and condensation risks, even before the problem is visible. The BTS algorithms assess relative humidity, ambient room

temperatures and cold surface temperature risks over time to apply a room-by-room 0-100 risk score. These are based on root cause issues such as underheating, the inherent thermal performance of the building, excess moisture generation and ineffective ventilation.

Using mould risk data

Social housing providers can use this information to target specific properties or rooms in homes, like bathrooms and bedrooms, that are at higher risk of mould.

Proactive measurement improves the relationship that residents have with their social housing provider. It provides residents with peace of mind that their homes are safe to live in and that any issues will be confronted before their living conditions are impacted. Only with the data can housing providers better understand how the homes are being used and what interventions work most effectively.

Excess cold and dampness in homes is a pervasive issue in UK housing and the long-term impacts on health and wellbeing are extremely negative. Proactive measurement means that rather than reacting to resident complaints or a visual survey to detect mould, social housing providers can intervene before issues and costs spiral out of control.



Learn more about BTS' thermal performance and mould risk measurement system on the website www.buildtestsolutions.com

Contact



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