

# WH:SHF 2.1 & 3 Forum

## Technical monitoring for retrofit

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12th September 2025



# Build Test Solutions

## *Make Measurement Mainstream*

- Equipment manufacturers
- Tools to measure HTC, U-values & airtightness
- >120,000 measurements with BTS tools



# What do / mean by technical monitoring?

Did retrofit achieve its aims?

- Heat loss
- Overheating
- Ventilation sufficiency
- Damp & mould risk

**Clear, actionable metrics**



# Levels of Monitoring

01

**Survey (BaU)**  
**Visual inspections & record keeping**



02

**Modelling (BaU)**  
**EPCs - PHPP**



03

**Measurement (infrequent)**  
**Onsite, in-situ**



04

**Monitoring (very infrequent!)**  
**Ongoing management**



# Relevant requirements for SHF

## PAS2035:

- Ventilation
- Airtightness strategy

## Awaab's Law:

- Timely response to hazards
- 2026 extension to excess heat & cold

## SHF optional:

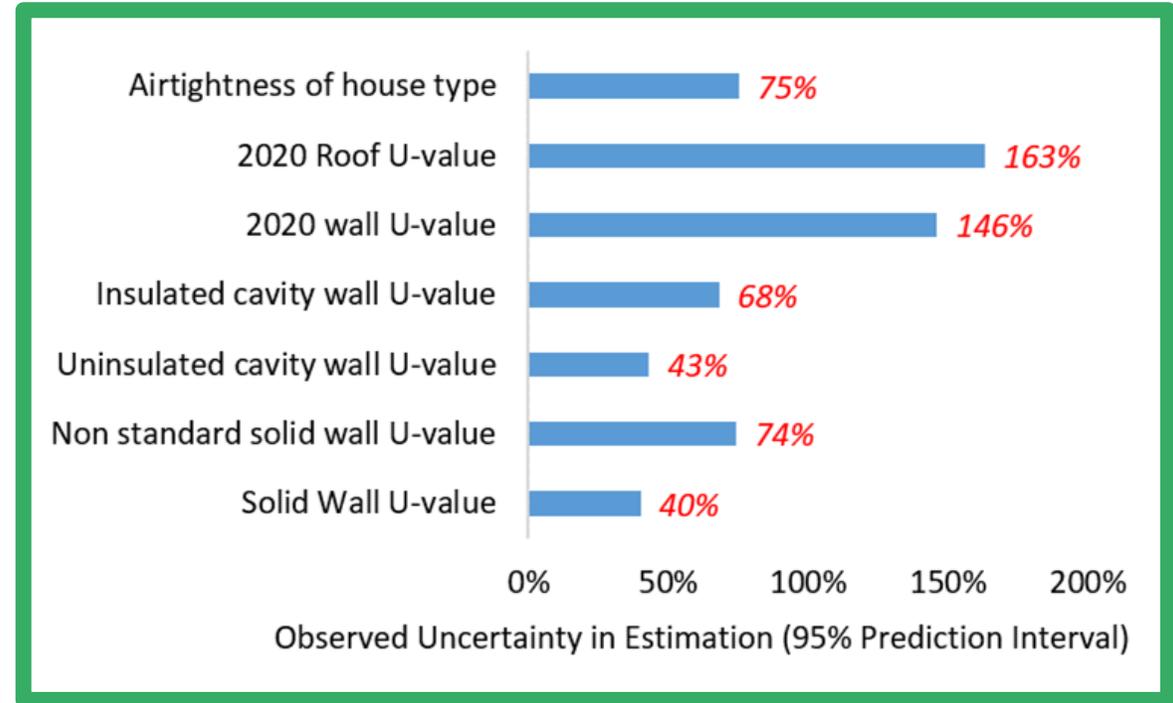
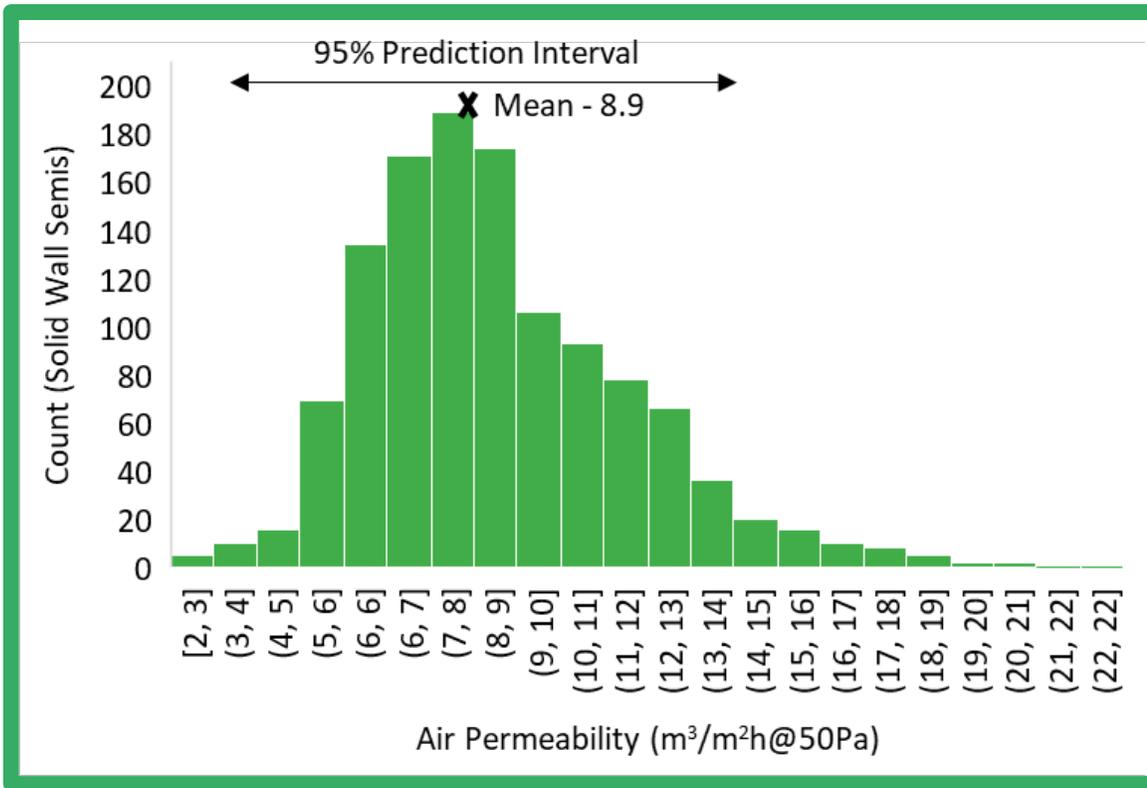
- Digitisation
- Evaluation Group B



# Why use in-situ measurements?



# Unexpected Performance is Typical

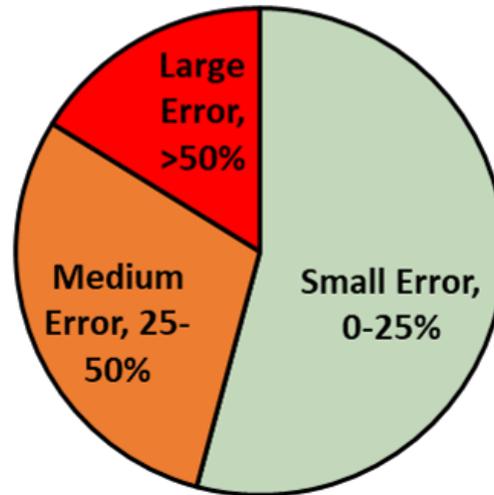


Studies by [BRE](#), [Historic Scotland](#), & [BPN](#)

# Unexpected Performance is Typical

Heat Loss is **Wrong by 25%+** in  
Nearly Half of EPCs

*587 Buildings Tested*



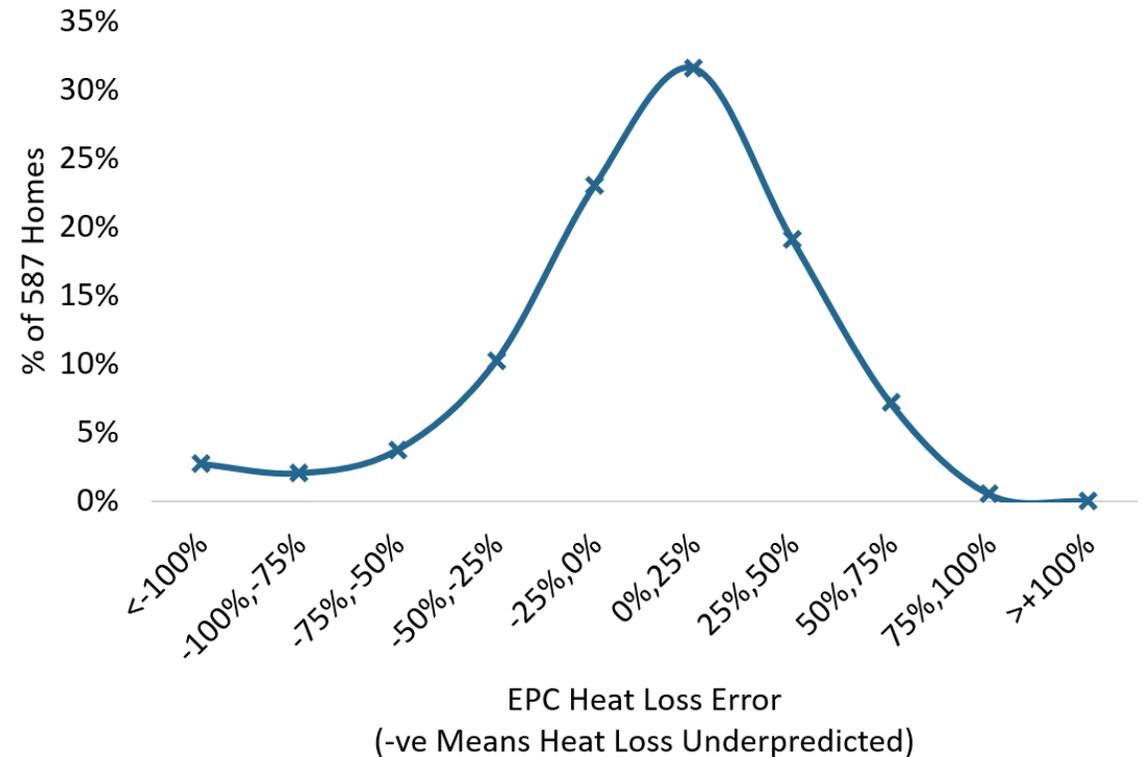
**energy**  
saving  
trust

 BUILD  
TEST  
SOLUTIONS

# Unexpected Performance is Typical

EPCs:

- **Right** on average
- **Wrong** for individual buildings
- In-situ measurement allows us to treat them individually



# How to see value, not cost?

- Specify the right retrofits
- Quality assurance
- PAS2035 compliance
- Digitisation funding
- Reduce mould risk
- 75% of homes gain 1-3 SAP points from airtightness test



# What tools are available?

<u>Measurement</u>	<u>Key Uses</u>	<u>Cost</u>
Airtightness	Ventilation design & assessment, EPC input, heat pump sizing, PAS2035 compliance	Low £100s
U-Value	Retrofit design & assessment, quality assurance, heat pump sizing	Low £100s
Whole building heat loss (HTC)	Heat pump sizing, stock triage	<ul style="list-style-type: none"><li>- £10s w/smart tech: (e.g. Switchee, Homelink, geo, Hildebrand)</li><li>- Low £100s as a standalone</li></ul>
Temperature & RH + mould risk monitoring	Risk management, Awaab's Law compliance	<ul style="list-style-type: none"><li>- £10s w/smart tech: (e.g. Switchee, Homelink, geo, Hildebrand)</li><li>- Low £100s as a standalone</li></ul>



# Timeliness

To really work, assessment needs to start pre-retrofit



# Case Study

BaU:

- Extract fans in place
- Trickle vents
- Cavity wall insulation
- Visible mould

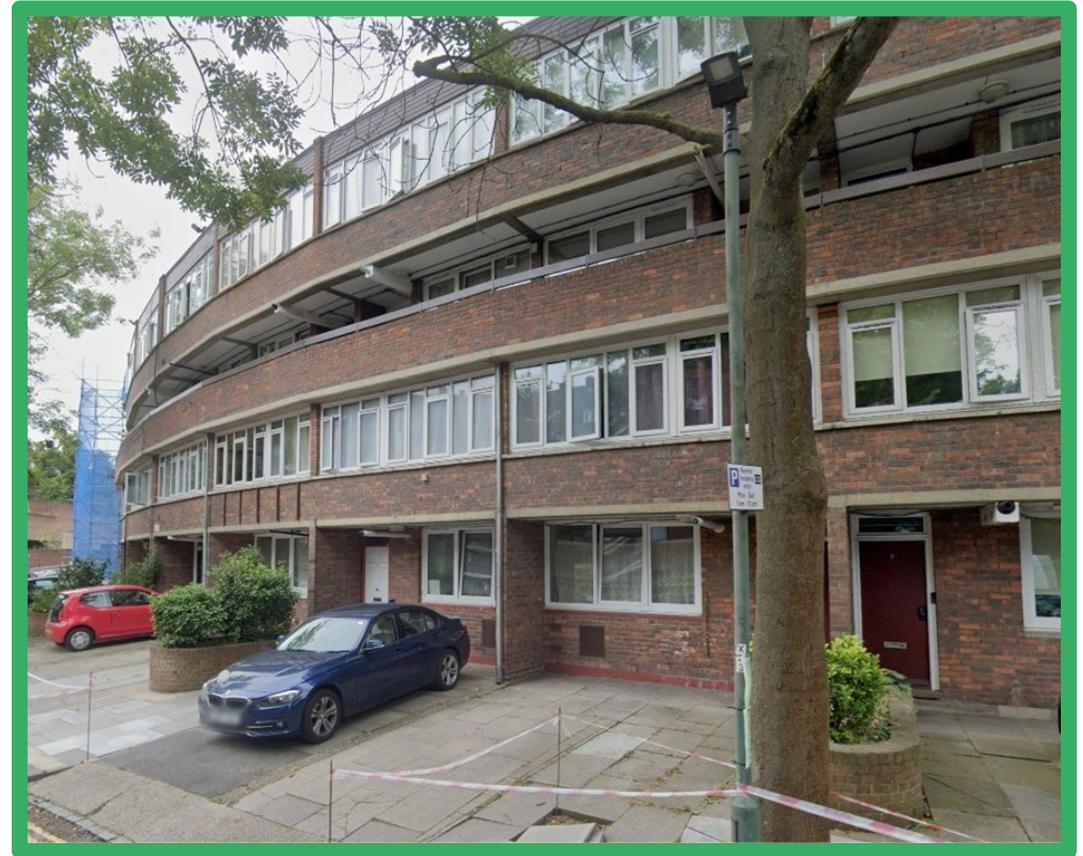
Conclusions:

- Heat loss OK
- Mould a bit of a mystery!



# Now Measure!

- HTC as expected
- V. airtight ( $1.9\text{m}^3/\text{m}^2\text{h}@50\text{Pa}$ )
- Fans poor (67% ↓ spec)
- Very high mould risk
- No cavity insulation
- Large thermal bridge



# Informed Asset Management

New conclusions:

- Very airtight building: **requires continuous ventilation**
- No wall insulation present: **retrofit opportunity**
- Thermal bridge could be problematic long term



# Case Study 2: Heat Pump Sizing

- ✓ 30% reduction in specified heat pump size
- ✓ £3,000 capital cost saving
- ✓ Warm & cheap to heat home

*Of 56 homes in our Heat Pump Ready project, BS EN12831 was wrong 70% of the time*



Mark &  
Jenny,  
Stroud



# How to Access The Tools

- Assessors: nationwide network, reduce home visits
- Installers: some evidence their own work
- In-house: Upskill your team
- BTS exist to help specify and source measurements

