RETROFIT ASSESSOR – LATEST DEVELOPMENTS

RESULTS OF FUTURE HOMES TESTING

PROFESSOR RICHARD FITTON (PhD, MRICS)

INTRO

ENERGY HOUSE LABS

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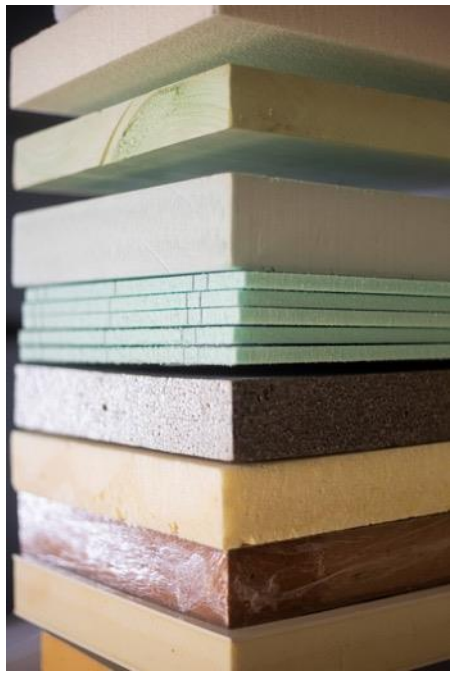
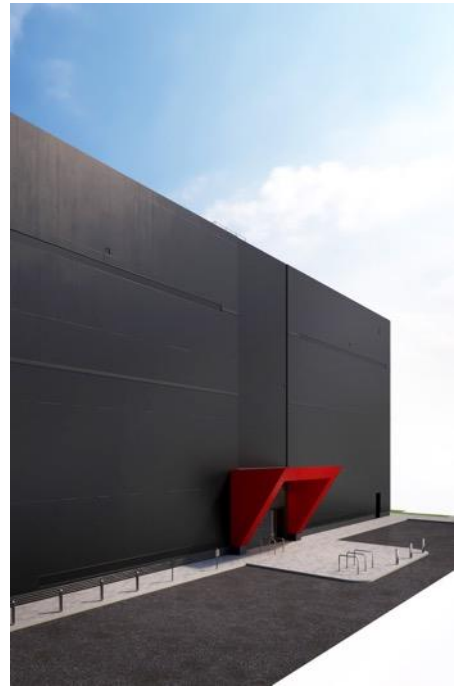
ENERGY HOUSE

THERMAL MEASUREMENT LABORATORY



SMART METERS SMART HOMES LAB

ENERGY HOUSE 2.0



ME

- Chartered Building Surveyor
- PHD in energy performance of buildings
- 20 years experience in housing
- Professor at the University of Salford.

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THIS PRESENTATION WILL NOT CONTAIN ANY RETROFIT DISASTERS

IF YOU ARE EXPECTING THEM, PLEASE LEAVE NOW!!

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OK – JUST ONE

THE STANDARD

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PAS 2035

Should cover all publicly funded retrofit in the UK

THE STANDARD

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BS:40104

British Standard on retrofit assessment process for domestic properties

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Role is mentioned in PAS 2035

- The work is already being done, in line with the basics laid down in the existing standard.
- Some have suggested that work may be lacking in quality or commonality
- There is a need to provide a full standard to this assessment to deliver quality assessments
- Over 340k Assessments already carried out (Figure from Trustmark)

Was always to be covered in a

SEPARATE British Standard

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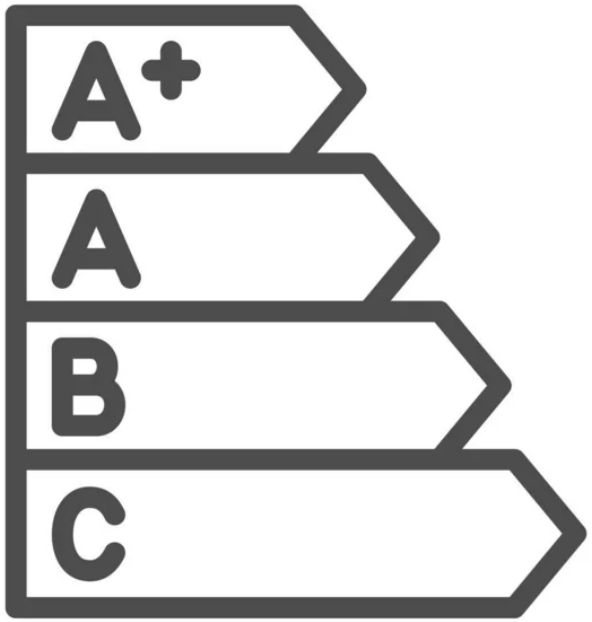

THE STANDARD

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Chair – Me

&

Well selected panel

THE STANDARD

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1. Jon Ducker - Insulation
2. Alan Pither - Energy efficiency consultancy and training.
3. Andrew Parkin PEPA
4. Andy Simmonds - Architectural design
5. Colin King - Energy performance
6. Peter Draper - Sustainable buildings
7. Andrew Champ – Insulation
8. Ludmilla Kosmina - Hygrothermal performance of building components
9. John Edwards – Building conservation
10. Stephen Hodgson – Property care association
11. Anthony Parkinson - RICS Property Standards
12. Joanne Williams – English Heritage

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EIGHT KEY AREAS

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CONTEXT

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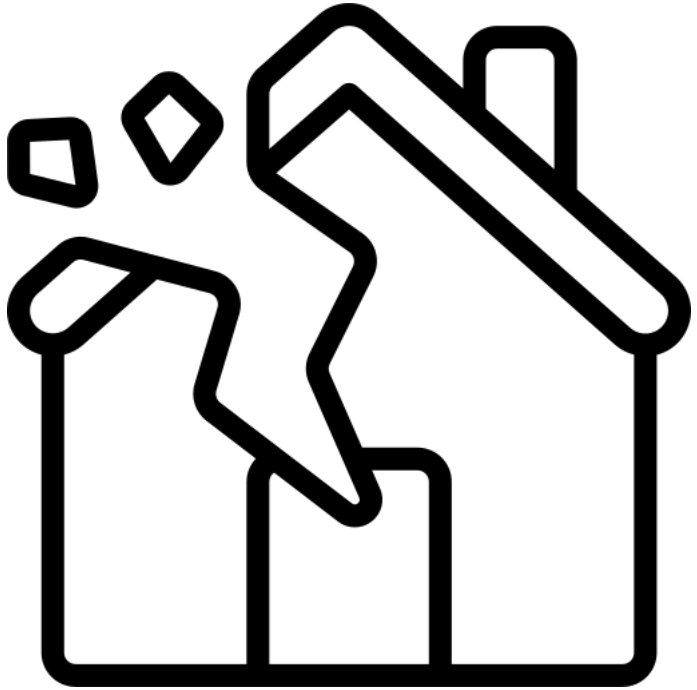
CONDITION



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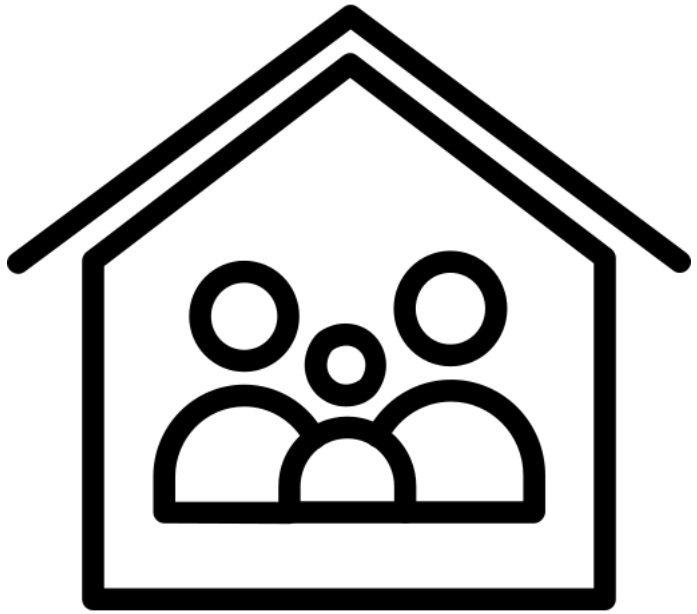
OCCUPANCY



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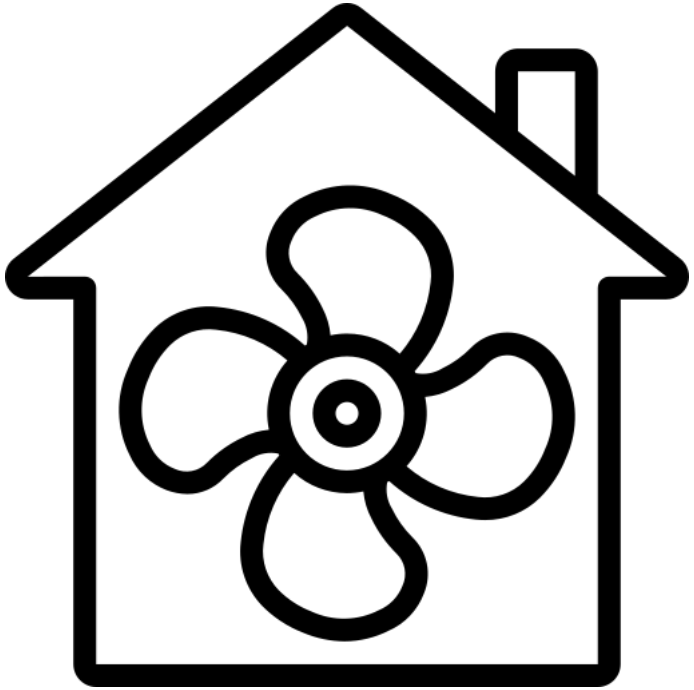
VENTILATION



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ENERGY

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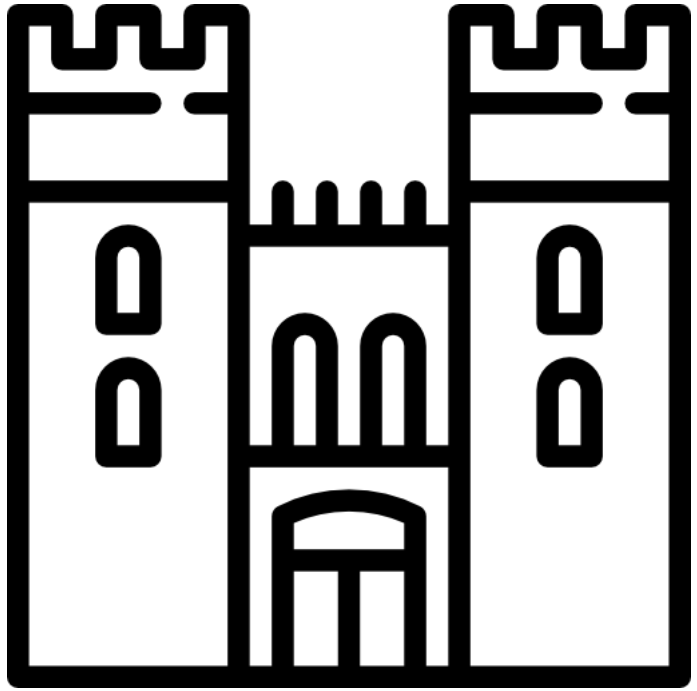
SIGNIFICANCE



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REPORTING, DRAWINGS, AND PHOTOS

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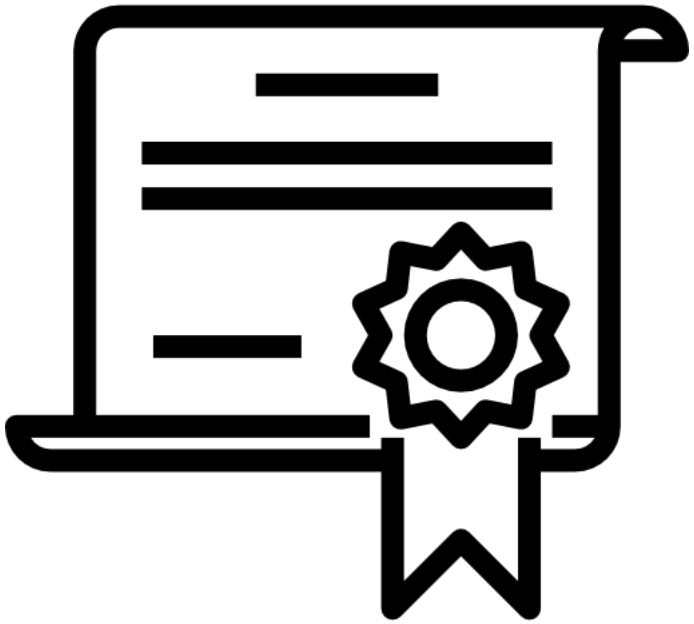
QUALIFICATIONS



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OVERVIEW

- Standard to be consulted in March 24
- A huge opportunity for high quality data.
- Condition and energy improvement evaluation is a pivotal moment
- Will hopefully help to minimise poor retrofit and poor outcomes

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RISKS of RETROFIT

???

RISKS

Homes consume around 35% of energy in the UK emitting 20% of our total carbon dioxide emissions

To achieve net zero carbon by 2050, we will need to improve almost all the UK's 29 million homes

The UK Green Building Council say that 1.8 homes per minute will need to retrofitted to deliver the UK government's commitment to net zero by 2050.

RISKS

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However, the main risks are:

- People continue to remain in Fuel Poverty (In 2020, there were an estimated 13.2 per cent of households (3.16 million) in fuel poverty in England) (DHLUC 2020)
- People continue to die in from cold conditions in poor quality homes 8,500 people died in England and Wales last winter due to cold homes in 2020 (ONS 2020)
- Hazards that cost the most for the NHS are those exposing occupants to excess cold continue – presenting an annual bill of around £857m (BRE 2021)

WHAT IS ENERGY HOUSE 2.0 ?

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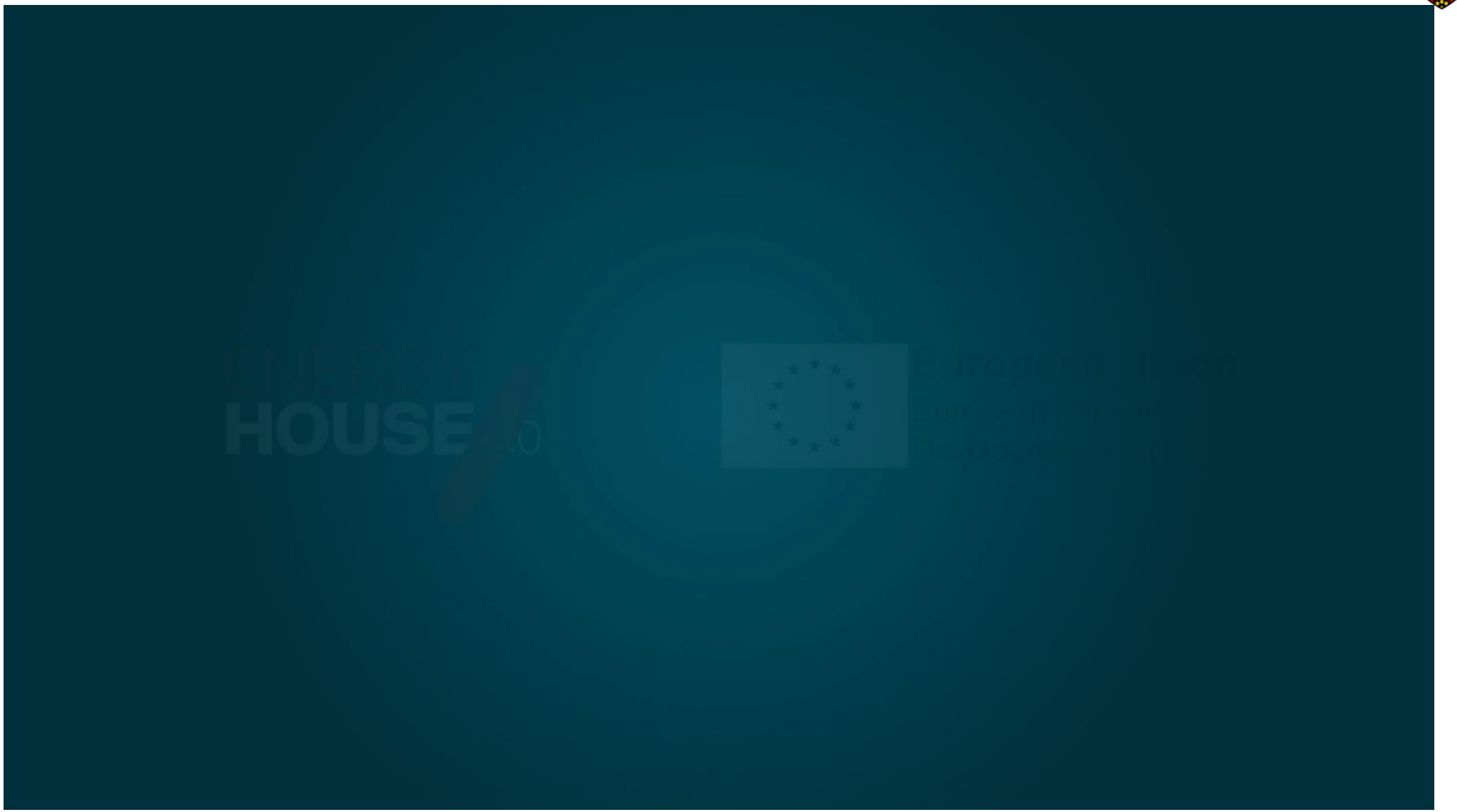

FUTURE HOMES FINDINGS?

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Future Homes Standard will happen in 2025 (TBC):

- 75% carbon savings compared to 2013
- Zero carbon ready
- Efficient fabric, more airtight
- They will have lower running costs
- Solar PV, batteries and EV chargers will be common
- Air Source Heat Pumps, - No gas

EH2 has two real homes (Saint Gobain & Barratt, and Bellway Homes) very similar to FHS.

These ARE the houses of the future.

FUTURE HOMES RESULTS

This stage of the testing examined how the homes performed.

Measured the actual performance of the building (under controlled conditions in the chamber) to see how well they performed when compared to the design.

We examined:-

- The airtightness
- How efficient the elements are at retaining heat
- Air leakage paths using thermal imaging
- How efficient the house at retaining heat.

Both houses performed well in terms of how they lost heat,

Past trials have found “gaps” of up to 140%

FUTURE HOMES RESULTS

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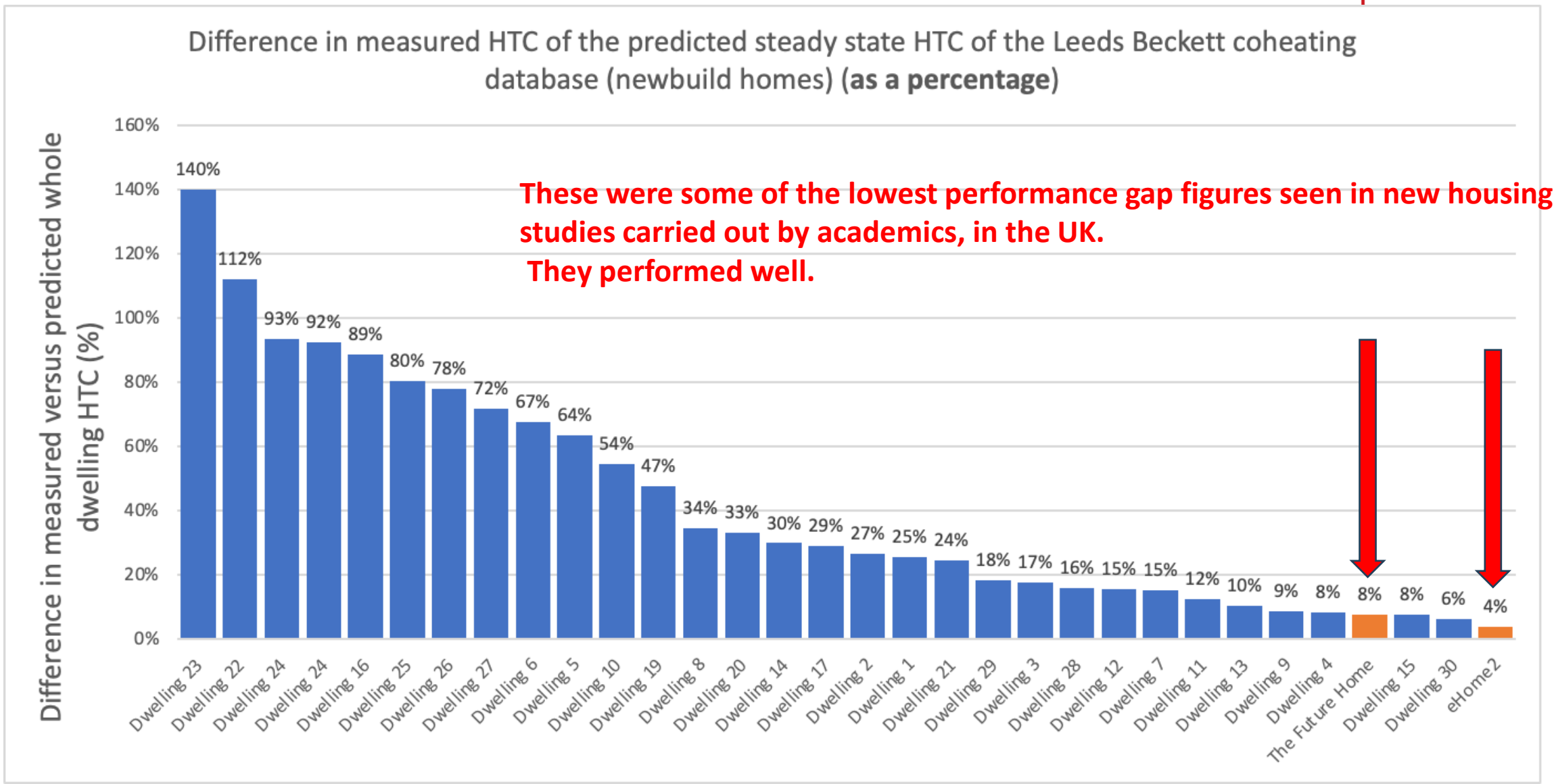

These were some of the lowest performance gap figures seen in new housing studies carried out by academics, in the UK.
They performed well.

BELLWAY HOMES RESULTS

- Whole house heat loss was 7.7% worse than the design
- The airtightness of the home was 61% worse than the design
- The loft insulation was disturbed and not as intended and was found to be underperforming by 56%
- The windows and doors generally performed as designed
- The floors generally performed as designed (although very difficult to measure)

BELLWAY HOMES RESULTS

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Overall, the Bellway home performed well.

The airtightness could have been improved,

The housebuilders, must “stick with” these houses for the rest of the work.

The main issue was airtightness:

- Prototype home that has SIX heating systems
- Full array of sensors and cables inside
- Many service penetrations

Loft insulation - this can be disturbed by trades and is usually less than perfect, the loft has a timber deck, insulation was difficult to remediate

There were also some issues around sealing of joints at the ceiling to wall - both homes had this issue.

BELLWAY HOMES RESULTS

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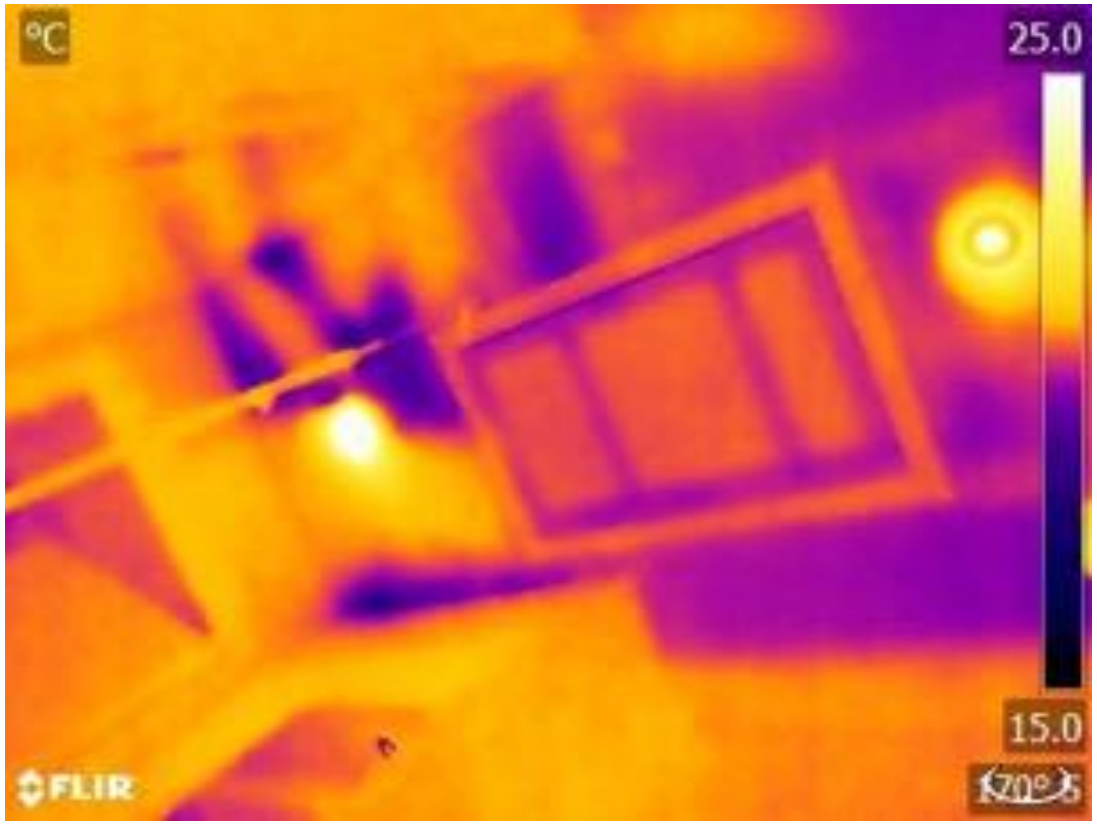
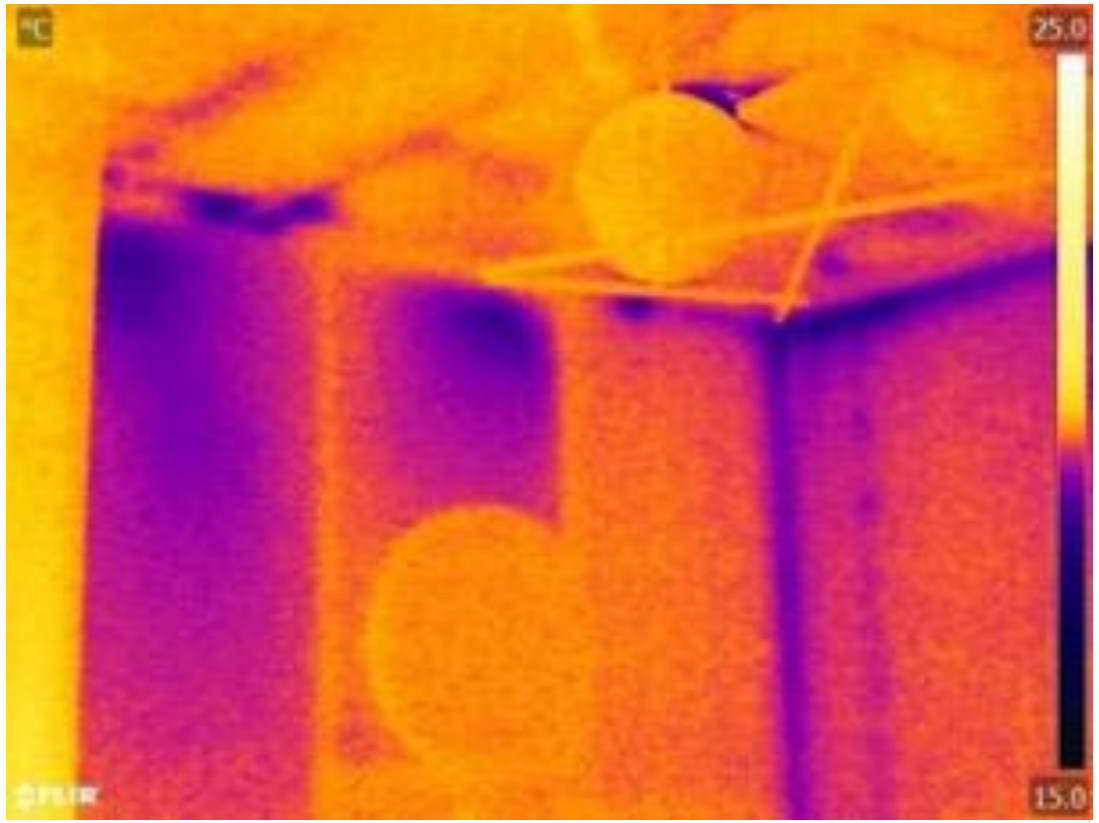
Disturbed loft insulation, this portion is beneath a timber deck which may have made installation more difficult



Air passing behind internal plasterboard due to incorrect sealing



SAINT GOBAIN & BARRATT HOMES RESULTS

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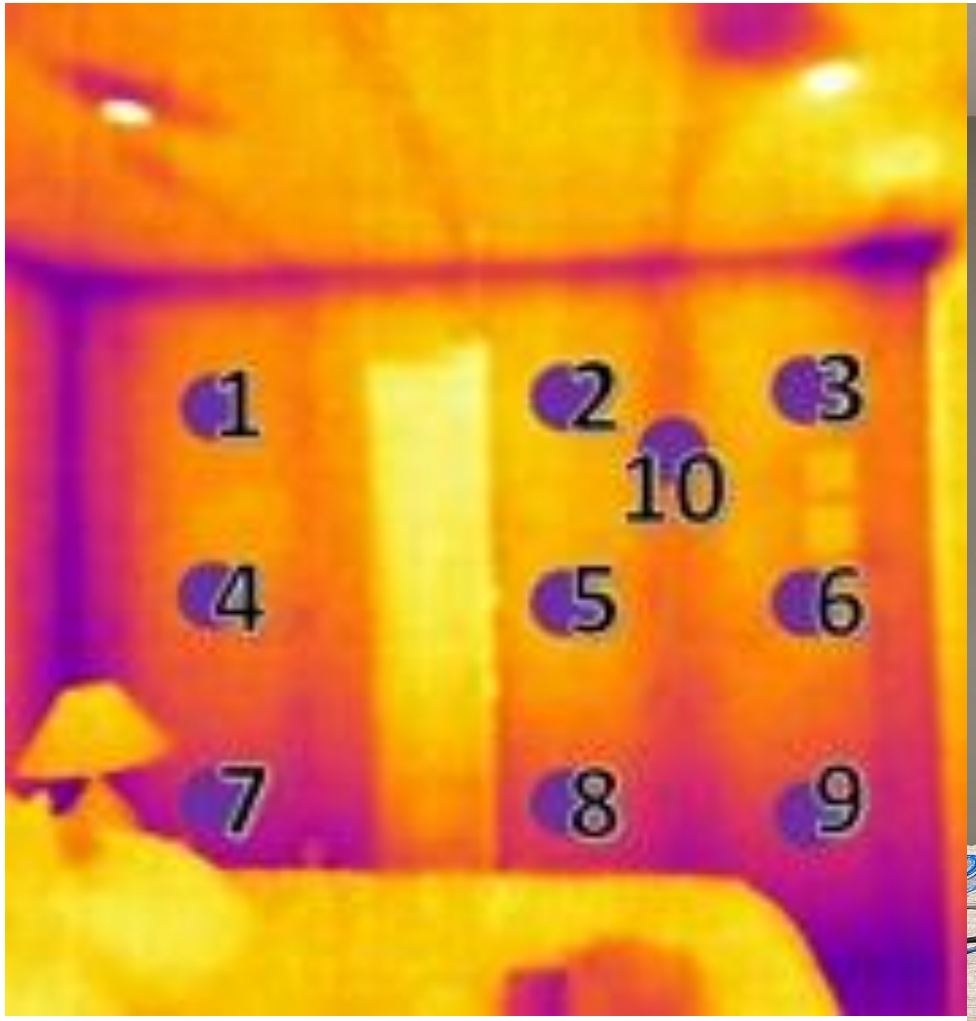
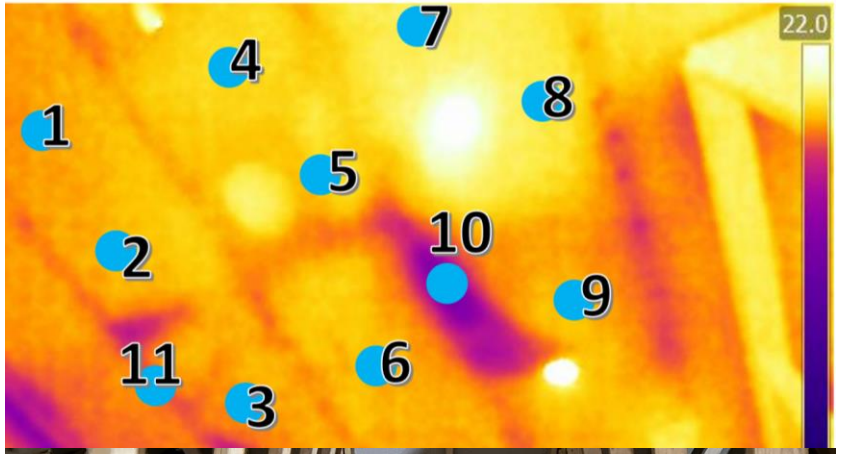
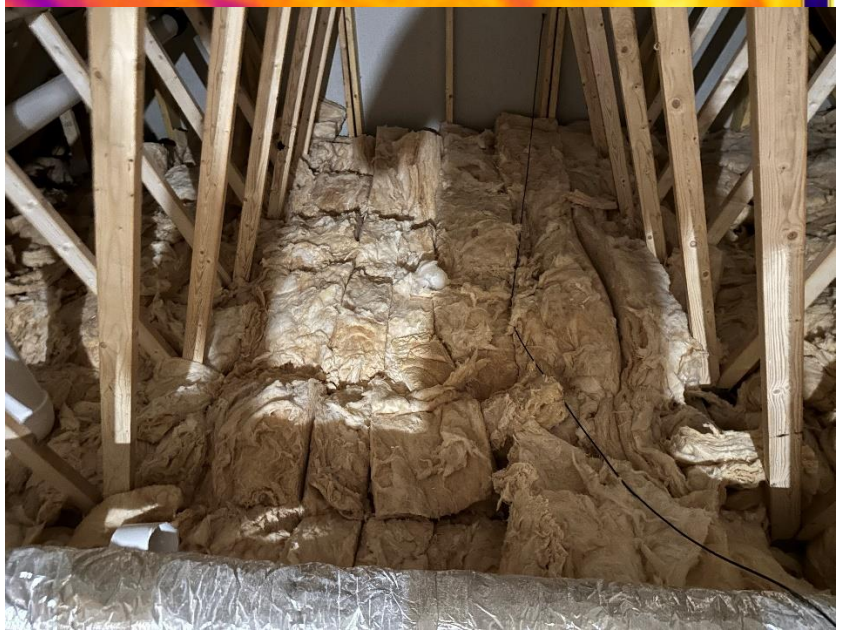
- Whole house heat loss was 3.9% worse than the design
- Airtightness rate, was BETTER than expected by 6.3%
- Some factory insulated wall panels did not perform as designed - underperformance of 63% in terms of heat loss
- The loft insulation was disturbed and not as intended, an underperformance of 26%
- The windows and doors generally performed as designed
- The floors generally performed as designed (although very difficult to measure)

SAINT GOBAIN & BARRATT HOMES RESULTS







SAINT GOBAIN & BARRATT HOMES RESULTS

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Overall, the home performed well

- The main issue was around the factory assembled wall panels,
- These were dismantled by the research team some of the insulation was not placed correctly
- The airtightness of the building was better than designed, we feel that this was down to the panels being made off site, and close supervision on site to this detail.
- The building did also not have as many different heating systems in as Bellway - so less holes.

THANKS FOR LISTENING

ENERGY HOUSE LABS

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