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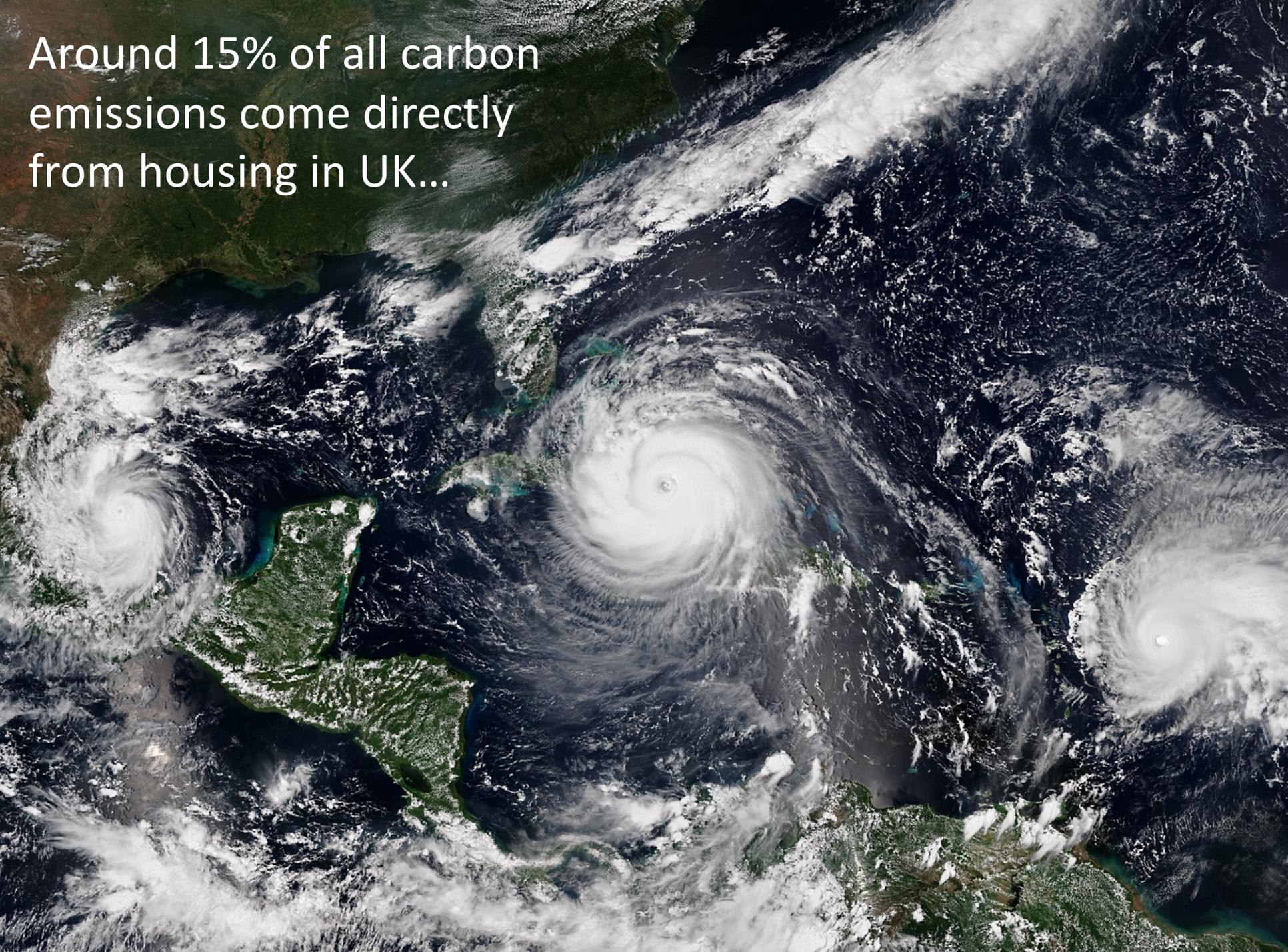
Fionn Stevenson

Housing Fit for Purpose: Performance, feedback and learning

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Around 15% of all carbon emissions come directly from housing in UK...



The UK housing challenge

UK Climate Change Committee 2019:

“The 29 million existing homes across the UK must be made low carbon, low-energy and resilient to a changing climate.”

“There are plans for 1.5 million new UK homes by 2022. These new homes must be built to be low-carbon, energy and water efficient and climate resilient.”



UK housing: Fit for the future?

Committee on Climate Change
February 2019



The housing BPE challenge

UK Climate Change Committee 2019:

“Greater levels of inspection and stricter enforcement of building standards are required.....

The ‘as-built’ performance of homes, for example how thermally efficient they are, must also be better monitored.”

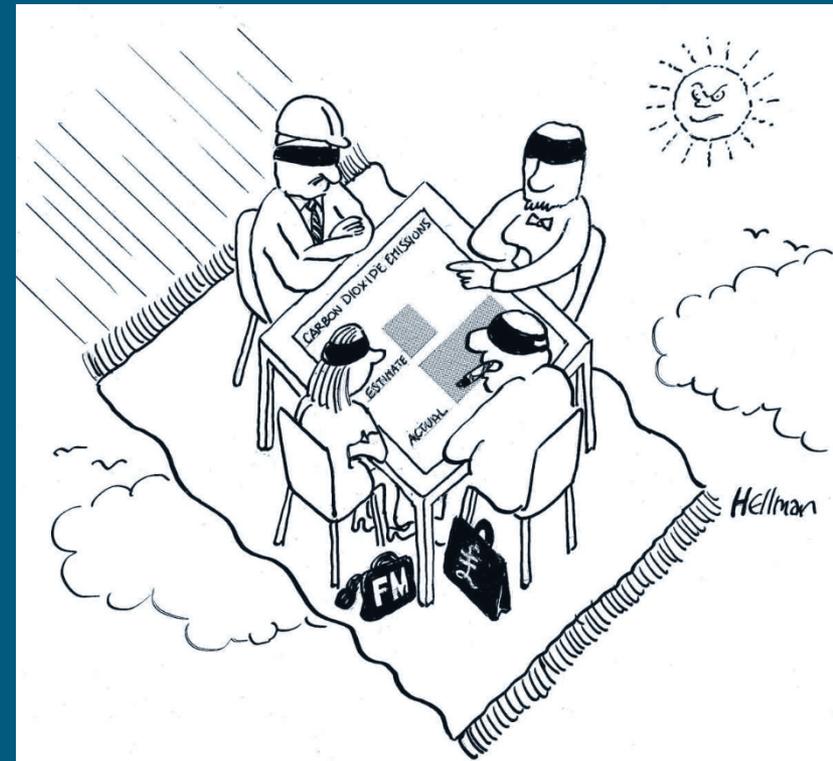


Image: Bill Bordass and Louis Hellman

The dream timber design (and simulation)

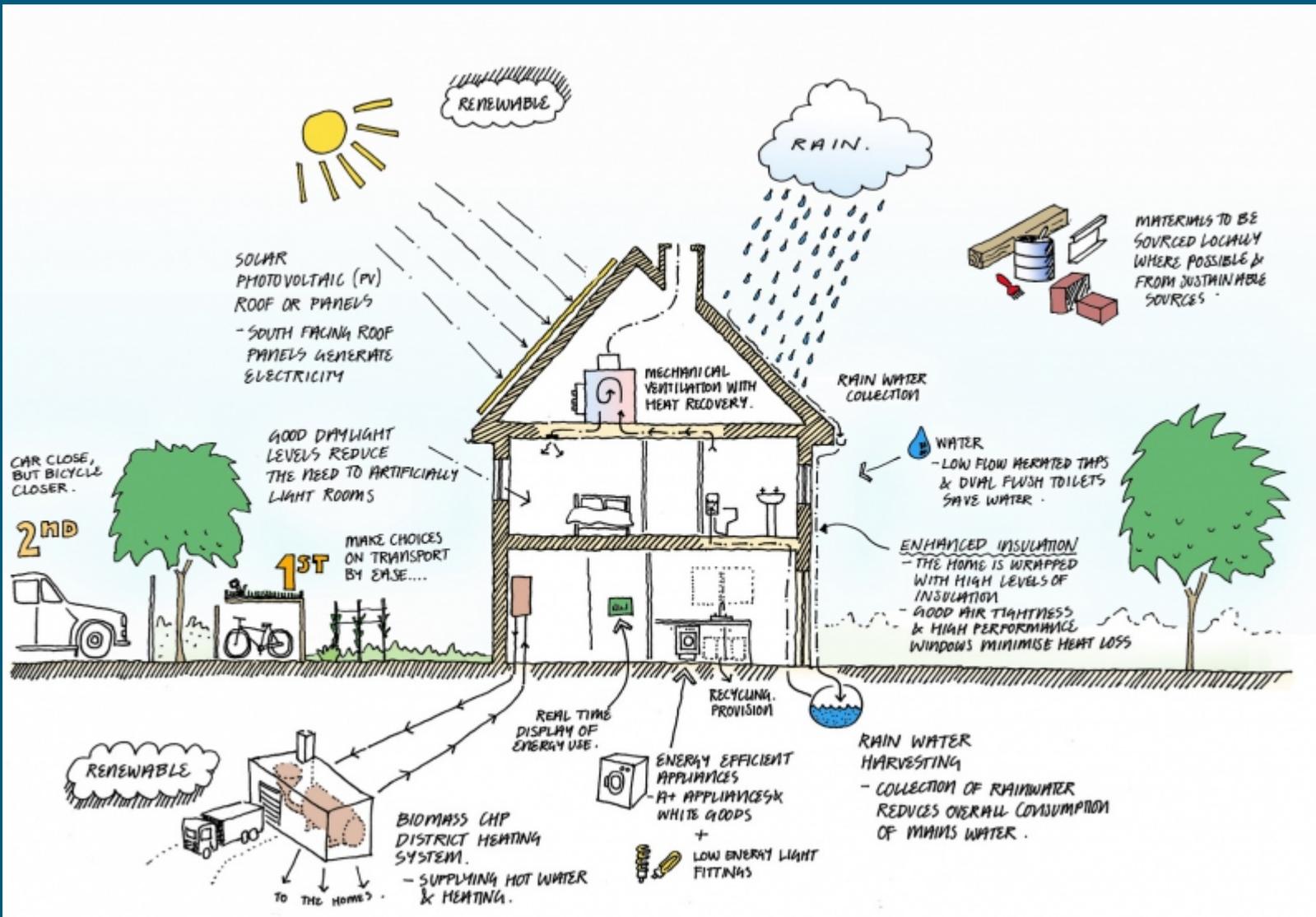


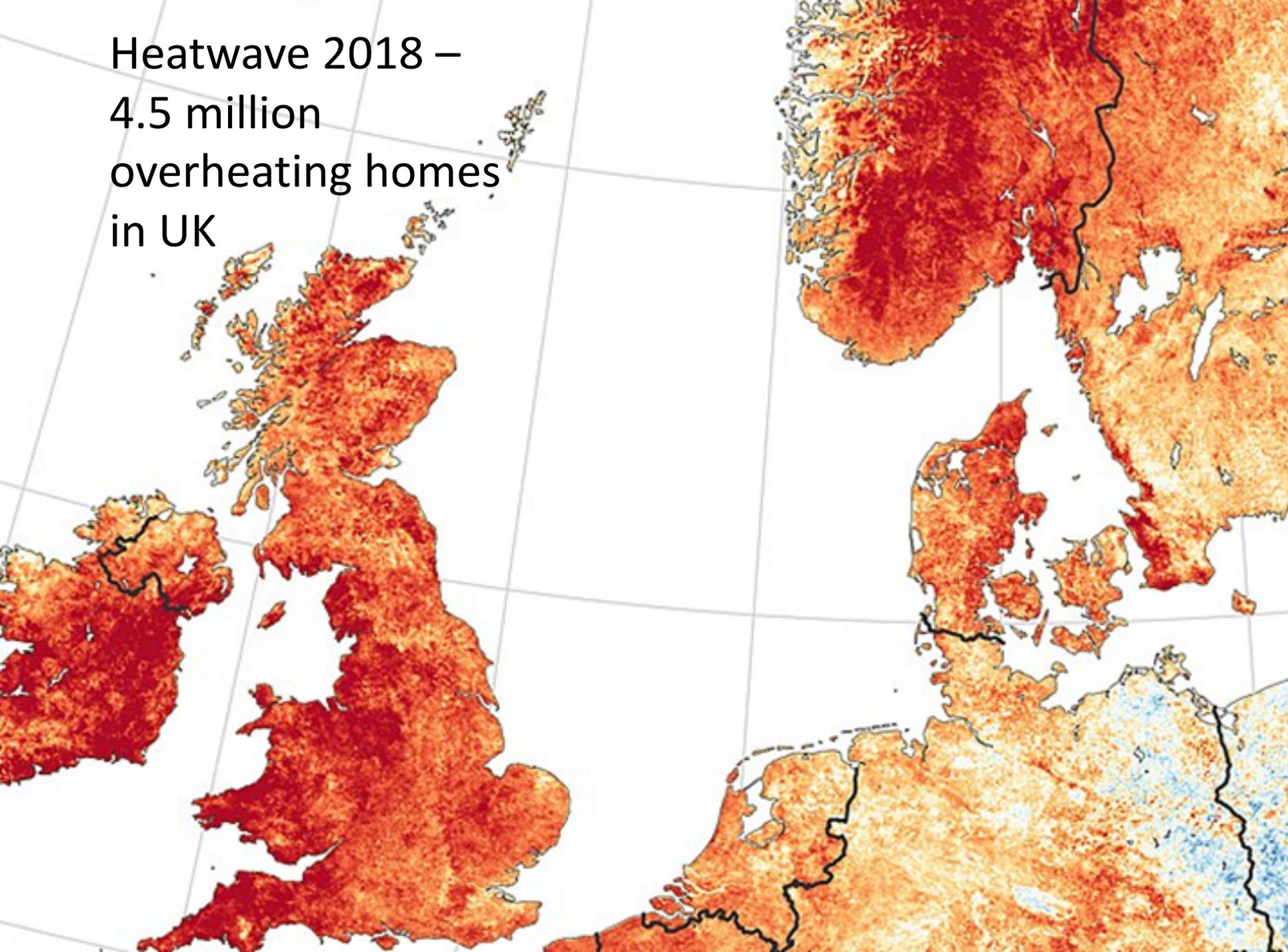
Image: Farrell's Architects



... the reality



Heatwave 2018 –
4.5 million
overheating homes
in UK



Health issues in homes -
5.4 million have asthma
in UK





We know our homes are sick and under-performing



The housing BPE book

Six Sections:

1. Background
2. Learning from Feedback
3. Training for Feedback
4. Application and case studies
5. Challenges for the future
6. **Housing Feedback primer**

New book out 26th August 2019



What's new?

As well as usual BPE, chapters on:

- Socio-cultural theory
- Ethics
- Innovation
- Education
- Cost
- Effective feedback loops

Aligning with RIBA 'Sustainability Overlay' workgroup on Plan of Work/Soft Landings/POE – launch November 2019



Key questions for evaluating home performance

1. Is the home physically performing as expected?
2. Are the inhabitants happy with their home?
3. Are there any problems that need solving just now?
4. How can we improve our housing for the future?

Leaman and Bordass – still solid!



Key parameters for evaluating housing performance - for real

1. **Design intentions compared to reality** – any specification/construction changes? why?
2. **'Hard' data** – physical comfort factors, pollution levels, fabric and technology performance, energy use, water use.
3. **'Soft' data** – perceived human needs and capacities, comfort, control, learning, satisfaction.
4. **Compare all data to revise design of homes- and future-proofing for climate change.**

...but how do we mainstream this?

Listen to the house builders...

“...they just didn’t understand the mechanics of the business. Or even if they did understand the mechanics of the business, they didn’t understand that –they wanted go in there and cover everything in kit and do it for 10 years and take data every 5 seconds. We just can’t cope with that.

Its not feasible, practical for a customer perspective. And the sort of data we were being hit with was totally unmanageable. It’s just too - I don’t know if esoteric is the right word – I mean, that’s okay because you are bunch of boffins, but that means nothing to me. I have to turn this into something meaningful as part of the business. “

Top 10 UK Housebuilder BPE Client

...we have to get the pitch and tone right with BPE

Drill down with POE, don't bean-count...

1. **Light touch POE** first – cheap, quick and effective -£5 to £10K. If the home is performing as expected – STOP HERE!



2. **Diagnostic POE** next – more intensive POE methods - £20- 50K+



3. **Forensic POE** – use this level for the most stubborn and emergent problems, or for epidemiological data – very intensive, lots of kit - £50K+

...**look for the exceptions** – don't monitor the routine.

'Light touch' POE for housing – six actions...

1. **Document review** - key design, construction and specification documents related to the project intentions
2. **Basic energy and water use audit** – measure in kWh/m₂/pa and litres/home/pa
3. **Thermographic survey** – one home, inside and out
4. **Simple survey** of the inhabitants – use Arup BUS questionnaire or equivalent
5. **Short tour** - of one home, with design team, contractor and inhabitants
6. **Spot-check** - environmental conditions – heat, light, sound, humidity, smell

... no sensors... yet !

Simple POE
– mobile
spot testing
equipment





Thermography – simple, cheap and effective.

Empowering inhabitant BPE through co-design and co-learning

1. Cohousing, Co-ops, Build-to-Rent, **social housing**
2. The challenge is **private/for sale**
3. Inhabitant representatives for BPE during participatory design process

1. Greater understanding achieved
2. Greater buy-in and ownership of POE



- Self diagnostic POE
- Smart meters and minimal sensors/apps
- External monitoring only if necessary



Forensic BPE/POE as
necessary – part of ‘Soft
Landings’
contractual commissioning
checks



The business case for POE

1. Process and product improvement
2. Reduced risk and hidden liabilities
3. Reduced defects
4. Reduced maintenance
5. Futureproofing
6. Customer satisfaction
7. Better reputation

So, why has POE not happened?

- Not a mandatory requirement (Grenfell – time to lobby)
- Not required by professional bodies (RIBA ‘voluntary commitment’)
- Not embedded from the start of project (Soft Landings)
- No fixed payment mechanism (Architects Appointment)
- No commitment from professions, policy-makers or business (lobby)
- The business case is not exploited (use it)

Perhaps another way forward is through the ‘performance guarantee’ housing development model put forward by ‘EnergieSprong’?



First EnergieSprong scheme in Nottingham 2019 – more on the way

Developing housing through assured performance

1. **Developer guarantees energy and comfort** performance through 'Zero on the Meter' Energy Plan: achieved through high insulation wrap around, PV panel systems and heat pumps.
2. **Inhabitants are given a fixed sum** guaranteed energy price
3. **Developer fixes any faults** - pays compensation to inhabitant if the home does not perform.
4. **POE plays a key part** – design continuously informed by performance evaluation

Organisational learning



Winning trust for BPE

1. We need to help architects and house builders to **learn to walk**
2. POE findings need to be embedded into practice design notes via BIM as routine activity
3. Workshops within practice help to embed the practice design notes based on POE findings into **practice culture**
4. Win – win: Architype Architects have done this for years, and they now produce buildings that perform to target.

Hanham Hall Image:
HTA Design LLP



POE to ensure homes are future-proofed for climate change



POE to enhance the ecology that we live within

Challenges for housing BPE and POE

Ethics – personal data protection – sensors are personal!

Education – if POE not embedded in undergraduate education, it won't happen

Innovation – is distracting. We have what we need – we just need to do it better

Monitoring – is not future-proofed for climate change disruption or hacking

Blame culture – new 'no blame' contracts needed in housing – as for Olympics 2012.



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