Housing Fit for Purpose: Performance, feedback and learning

Fionn Stevenson
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.”
The dream design prediction
... the reality
Around 15 - 22% of all carbon emissions come directly from housing in the UK...
Heatwave 2018 – 4.5 million overheating homes in UK
Health issues in homes - 5.4 million have asthma in UK
Homes routinely under-perform – including architect designed
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 now!
What’s new?

As well as usual BPE, new chapters on:

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

Aligned with RIBA ‘Sustainable Outcomes Guide’ 2020
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?
Key parameters for evaluating housing performance - for real

1. **Design intentions compared to reality** – any changes? why?


1. **‘Soft’ data** – human needs and capacities, comfort, control, learning, satisfaction.

2. **Compare all data to revise design of homes- and future-proof for climate change.**

…but how do we mainstream this?
Listen to the house builders...

“...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. “

*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!
Health issues in homes

5.4 million have asthma

Thermography – simple, cheap and effective.
Simple POE – mobile spot testing equipment
Empowering inhabitants through co-learning and POE

- Self diagnostic POE by inhabitants
- Smart meters, apps and minimal sensors
- External monitoring by others only if really necessary
LILAC – a case of action research engagement

A four-fold difference in energy use in households – why?
Adjusting energy uses to optimise PV

Major differences between homes depending on occupancy patterns and other factors – load shifting needs training for new habits

24 hours: Dwelling B

24 hours: Dwelling A

‘...I don’t understand how the PV system works but it makes a tremendous difference.’ Dwelling B Resident
Delving deeper to sort out problems earlier

- Forensic BPE/POE as necessary – part of ‘Soft Landings’
- Contractual commissioning checks
The 7 point 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

Now is a great opportunity to get ahead of the game – RIBA getting behind this – practices offering this service up from 10% to 19% in just two years.
The organisational learning ‘smile’...
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.

**Regulation** – it’s not mandatory – yet - needs more lobbying!
New LETI Zero Carbon Guide embeds building performance
Winning trust for POE

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, gaining repeat business.
POE cycle ensures homes are fit for purpose, as designed
Thank you.