

STBA CADW workshop, Caerphilly, 23 October 2019

The Shape of Future Retrofit

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Chair, BSI Retrofit Standards Task Group and
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The Shape of Future Retrofit

- Quality-assured retrofit
 - Each Home Counts | TrustMark | PAS 2035
 - From measure-based to whole-dwelling retrofit
- Grid decarbonisation or deep retrofit?
 - How much carbon will be left in the grid in 2050?
 - Can we get net zero carbon ready?
 - How precious can we be about traditional buildings?
- Scale retrofit - industrialisation or customisation?
 - Energiesprong or highly flexible repeatability?

Quality Assured Retrofit

Each Home Counts

An Independent Review of Consumer Advice, Protection, Standards and Enforcement for Energy Efficiency and Renewable Energy



Dr Peter Bonfield, OBE, FREng




Department for
Business, Energy
& Industrial Strategy


Department for
Communities and
Local Government

December 2016

Industry-led review

- Sponsored by BEIS and MHCLG
- Led by Peter Bonfield (BRE)
- Multiple work-streams
- Hundreds of people involved

Twenty-seven recommendations

- Consumer protection
- Advice and guidance
- Quality and standards
- Skills and Training
- Compliance and Enforcement
- Insulation and building fabric
- Smart meters
- Home energy technologies

Implementation

- Coordinated by a cross-industry Implementation Board
- BEIS support > £2 million

Each Home Counts

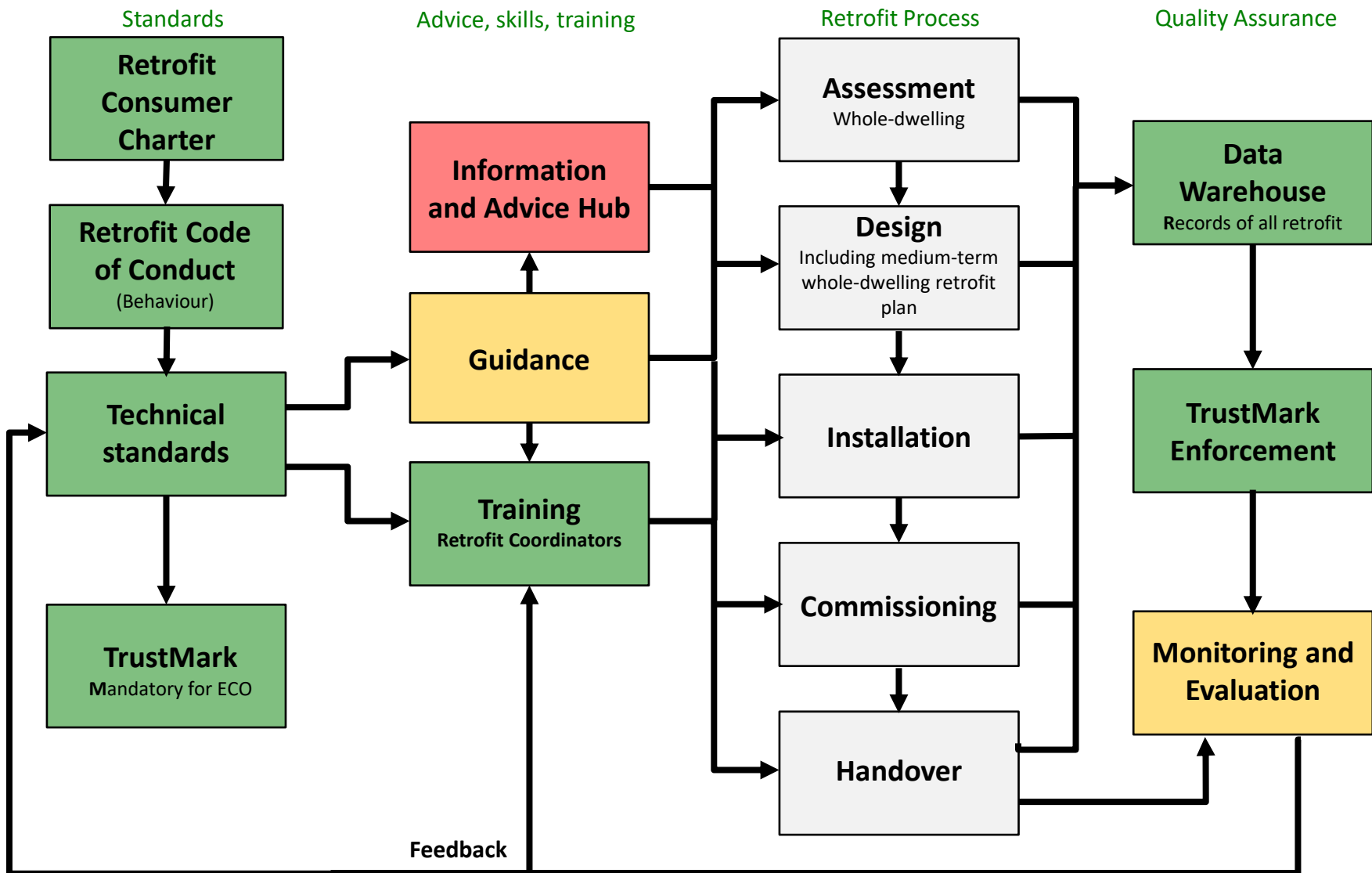
Twin strategic objectives

- Boost demand for energy efficiency from consumers and the public sector by restoring trust in the industry
 - By Government and the public
- Reduce risks to finance bodies, to encourage funding
 - Based on the assumption that there are private investors looking to increase their lending to the sector

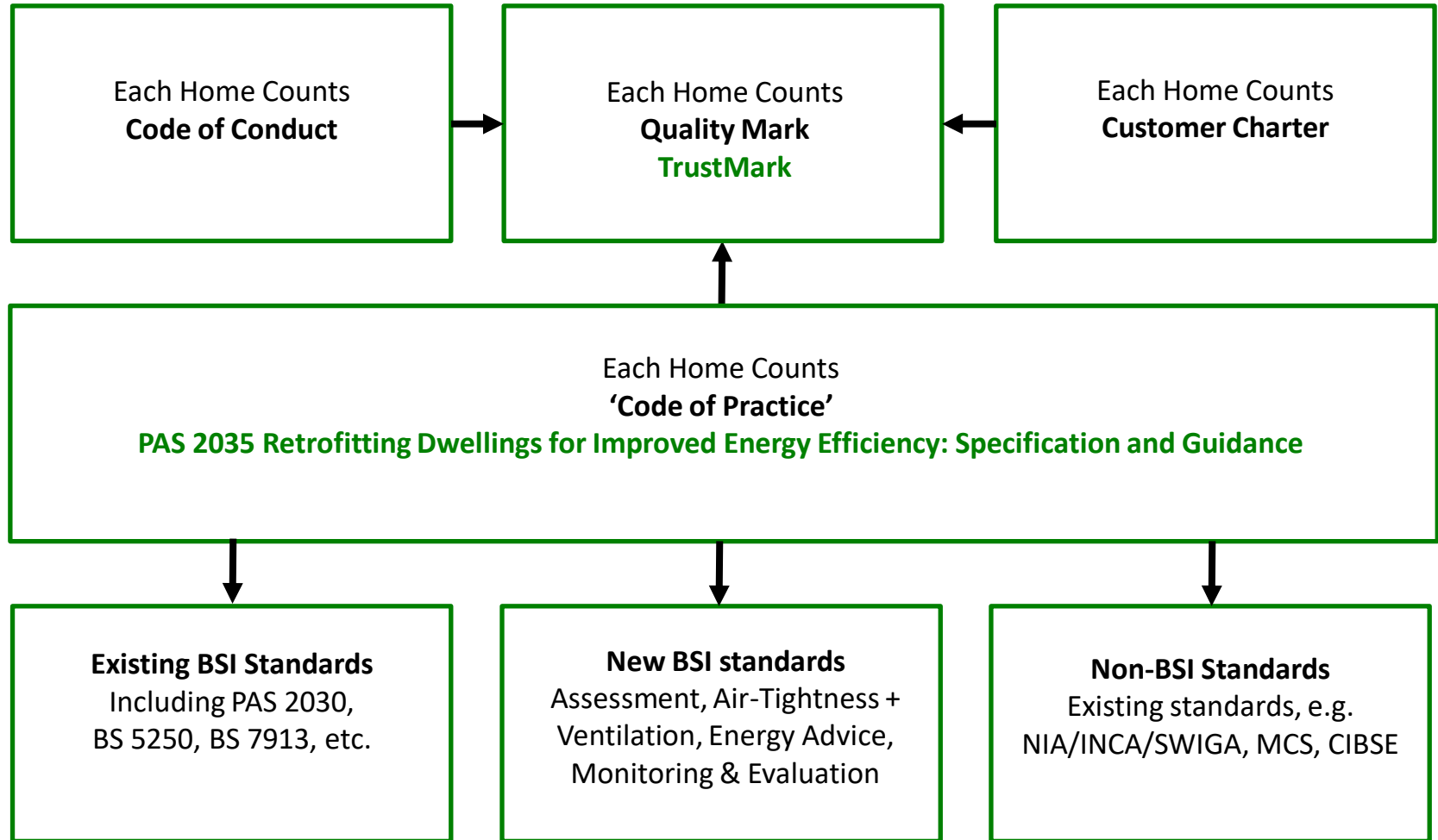
Implicit objective

- Encourage consolidation of the industry
 - Move away from fragmented, measures-based retrofit and adopt a whole-dwelling approach

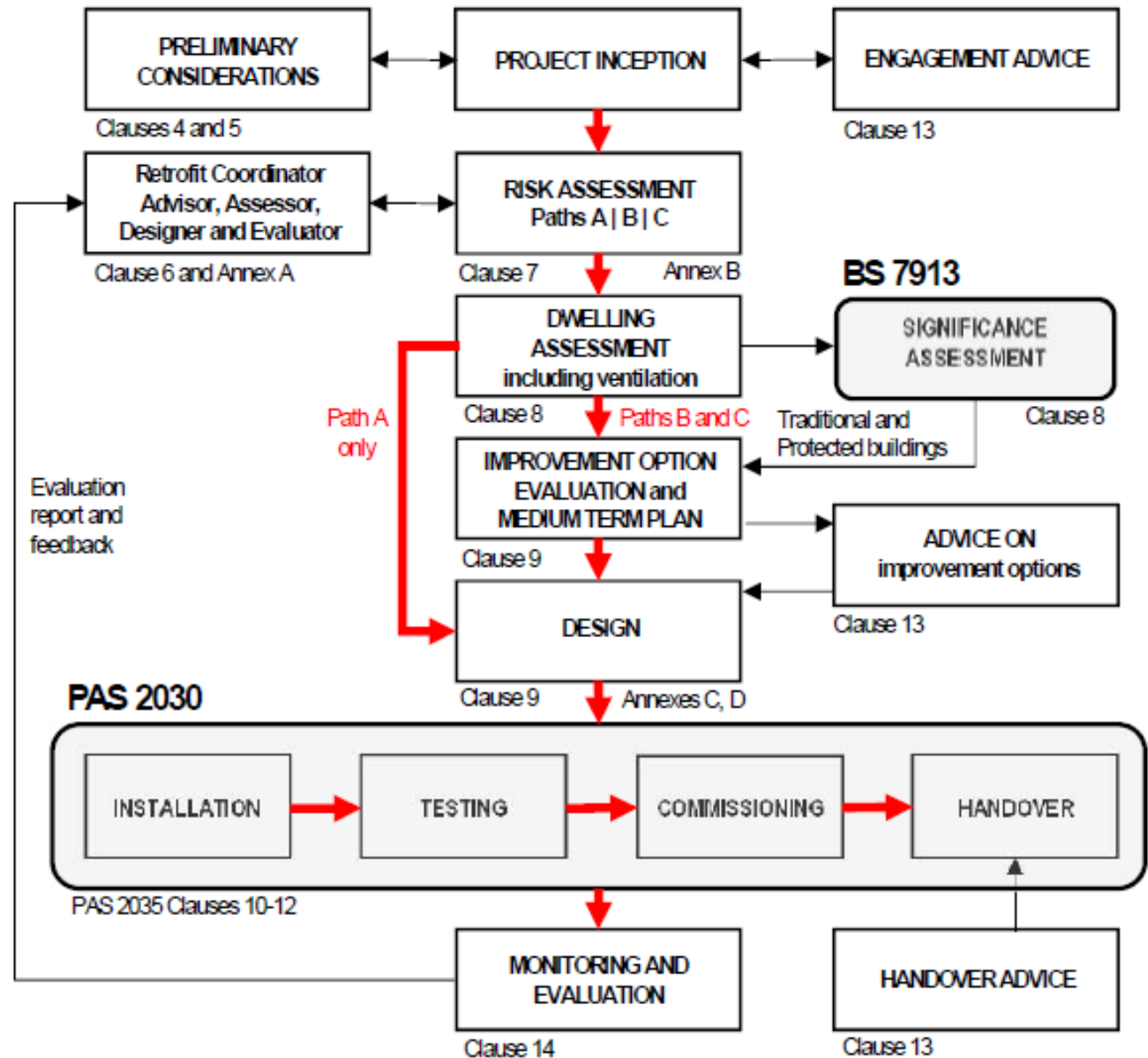
Each Home Counts *Progress 2019*



The BSI Retrofit Standards Framework



PAS 2035



PAS 2035 key points

- Overarching process standard
 - Requires compliance with many other technical standards
- Risk-based approach embraces
 - Projects of different scales
 - Traditionally constructed and protected buildings
- Codifies previous experience
 - Retrofit Coordinator required for every project
 - Emphasis on corners, junctions, edges and interfaces
 - No insulation without ventilation
 - Emphasis on moisture management
- Aims to consolidate the industry
 - Move towards whole-dwelling retrofit

Grid Decarbonisation or Deep Retrofit?

How can we specify net zero carbon retrofit if we don't know the extent to which the grid will be decarbonised in 2050?

Prof Tadj Oreszczyn, UCL

Decarbonisation?

- Decarbonise the grid at current demand
 - Requires ~ 28 x current wind power capacity
- Decarbonise the grid with domestic retrofit
 - Requires ~ 14 x current wind power capacity
- Decarbonise the grid with retrofit of all buildings
 - Requires ~ 10 x current wind power capacity
- But all-electric buildings will overload the network x 4
 - Simultaneously with converting cars to EVs
 - Conversion needs to be planned!

Grid Decarbonisation or Deep Retrofit?

...is the wrong question – we need to do both!

We also need smart demand management, better batteries and better heat pumps

How precious are traditional buildings?

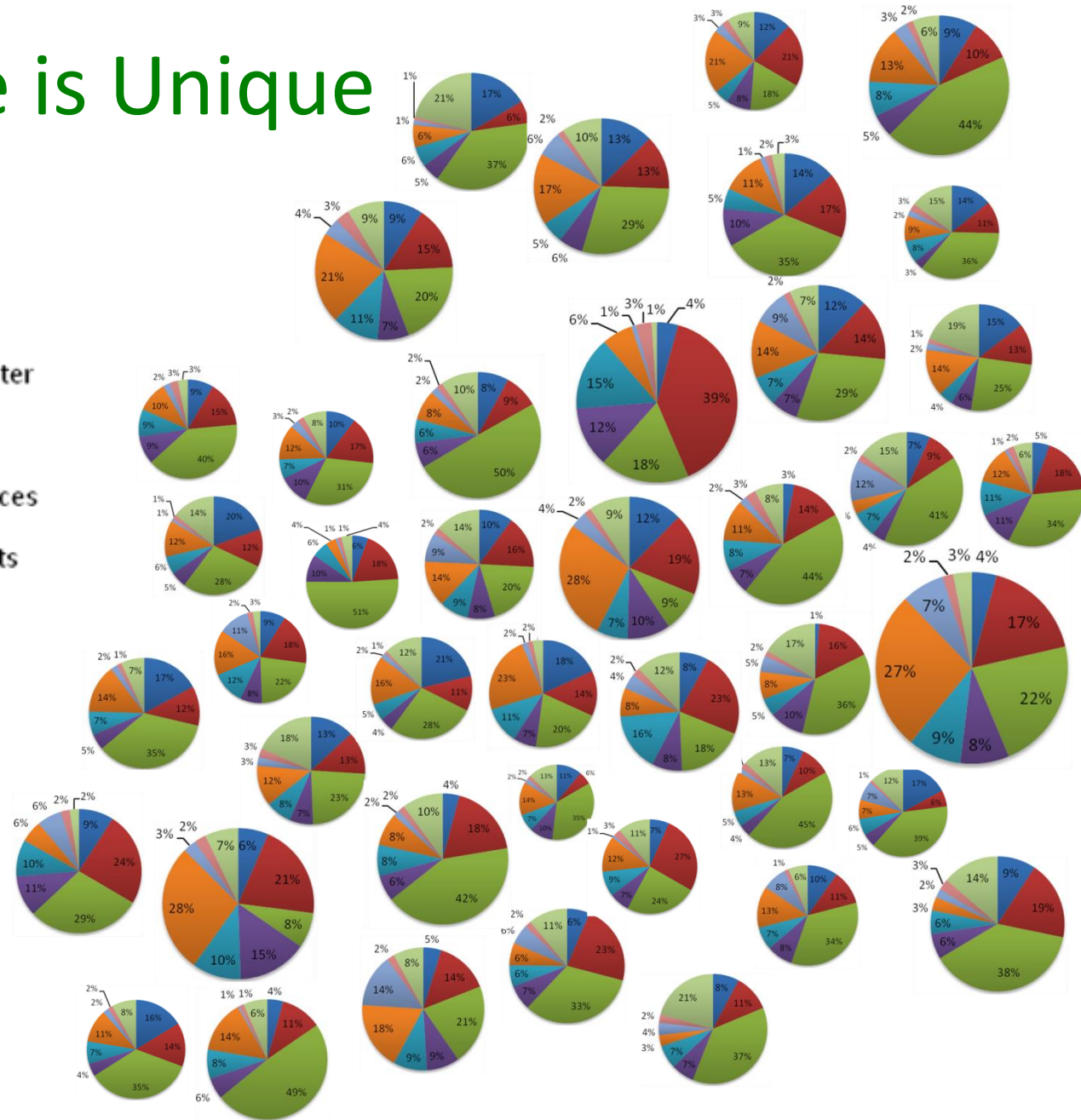
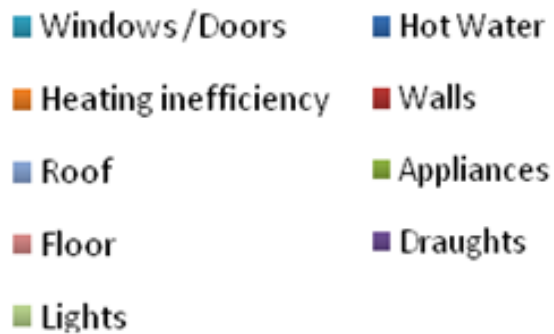
- Most protected and many traditionally constructed buildings cannot be deeply retrofitted
- So for every unimproved building we must
 - Generate more zero-carbon heat and power, or
 - Convert other buildings to become energy exporters, or
 - Plant trees to absorb carbon, or
 - Some combination of these measures
- The balance we strike will depend on the *value* we put on protected and traditionally constructed buildings

Net Zero Carbon Ready Retrofit?

- Can we get our housing stock net zero carbon *ready*
 - By perhaps 2040?
- Yes! The strategy is ‘fabric first’
 - Improve the building fabric to minimise demand
 - Improve the building services to satisfy demand efficiently
 - Remove fossil fuels in stages
 - Possibly hybrid heat pumps first, then full heat pumps?
 - Possibly some hydrogen in gas networks, some waste heat networks
 - ‘Top up’ to net zero carbon with renewables
 - After 2040, when we know the extent of grid decarbonisation
- Will there be enough roof space for solar PV?
 - Probably not, so we will need domestic or local batteries, smart demand management, and even more wind power

Retrofit Industrialisation or Customisation?

Every Home is Unique



Industrialisation or customisation?

- 27 million retrofits by 2050 requires
 - One retrofit every 45 seconds
 - Robust retrofit processes that work at scale
- Housing stock is not homogenous
 - Architecturally complex and technically vulnerable
 - Multiple tenure and funding constraints
- Off-site | Over-clad approaches
 - Energiesprong | Beattie Passive, etc.
 - Not a panacea – probably applicable to < 15% of stock?
- Retrofit repeatability and flexibility
 - Like building minis at Cowley – all different but all minis
 - A rich library of materials, products, details and processes

Summary

- We have initiated quality-assured retrofit
 - With Each Home Counts, Trustmark and technical standards
 - Ten years of work, but still a long way to go!
- Grid decarbonisation or deep retrofit?
 - Is the wrong question – we have to do both
- Retrofit will confront our valuation of traditionally constructed and some protected buildings
 - We will be challenged to justify their conservation
- Industrialisation of scale retrofit is not the answer
 - But repeatable, flexible mass customisation may be

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