



Pathways to Healthy Net
Zero Housing for Greater
Manchester

Background

- In September 2019, GMCA won grant funding from the Local Government Association's Housing Advisers Programme 2019/20
- GMCA procured and Parity Projects Ltd (with Bays Consulting, ADE Research and Energy Systems Catapult) were appointed in January 2020

Overview

Project timescale Feb – Dec 2020, four main streams:

‘Where are we now?’

- An energy model of every home in Manchester
- Probability of HHSRS hazards at individual home level

‘Where do we want to get to?’

- the most likely and realistic net zero CO₂ end-result

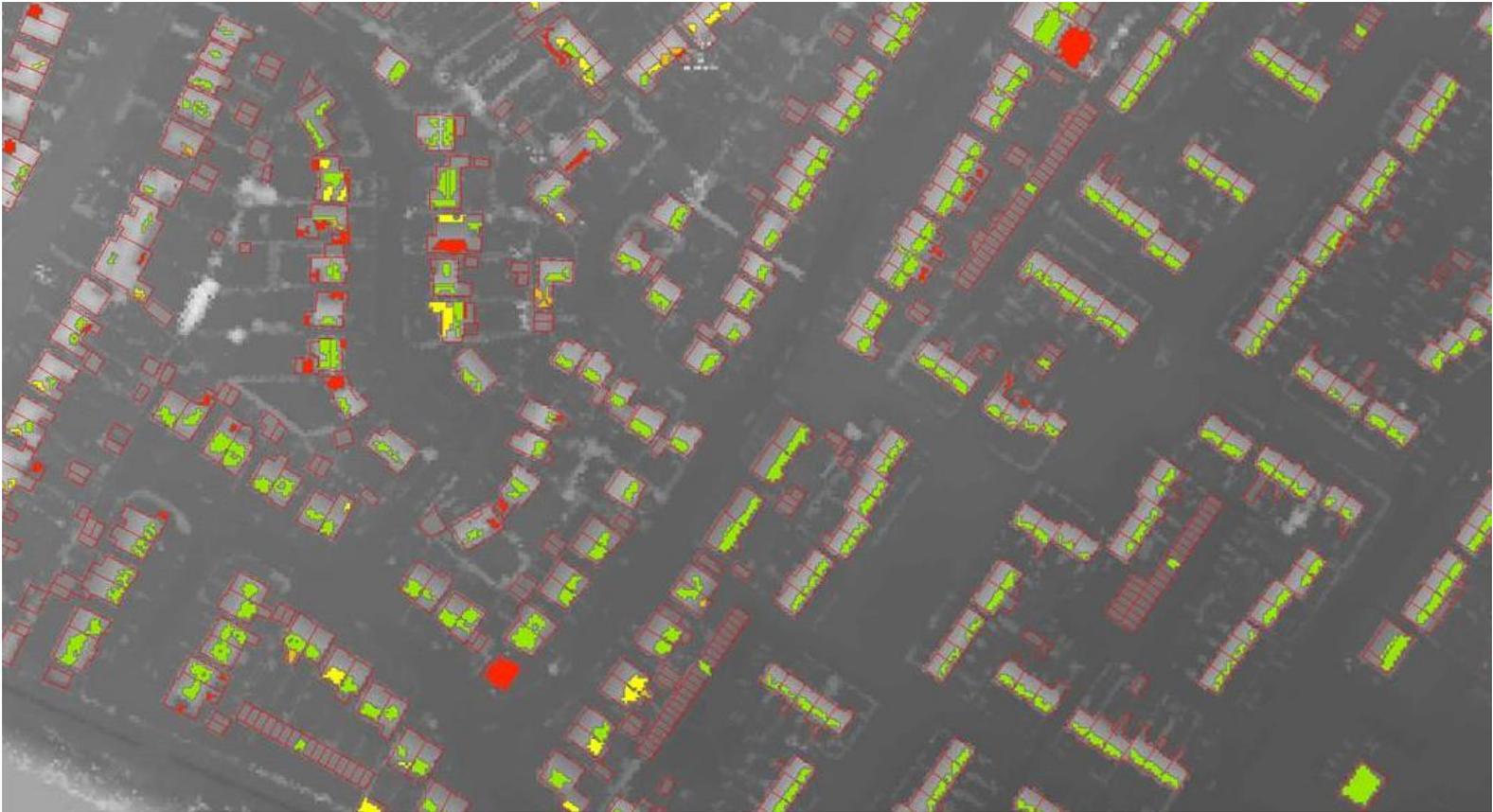
‘How do we get there?’

- Iteratively model a range of possible policy interventions

Energy model of every home



Energy model of every home



HHSRS hazards at individual home level

Predicted prevalence of hazard in borough: all hazards

| Predicted Hazard | Bolton | Bury | Manchester | Oldham | Rochdale | Salford | Stockport | Tameside | Trafford | Wigan |
|--|--------|-------|------------|--------|----------|---------|-----------|----------|----------|-------|
| Carbon monoxide | 59.8% | 55.2% | 97.9% | 68.8% | 43.6% | 84.7% | 78.3% | 81.3% | 73.5% | 20.6% |
| Collision and entrapment | 25.1% | 13.1% | 25.2% | 26.0% | 24.6% | 21.2% | 8.8% | 22.1% | 5.5% | 19.7% |
| Crowding and Space | 57.1% | 47.8% | 83.3% | 61.2% | 61.5% | 70.6% | 39.7% | 62.5% | 36.4% | 48.0% |
| Damp and Mould Growth | 48.8% | 47.7% | 57.2% | 49.4% | 48.8% | 47.0% | 44.1% | 50.3% | 42.0% | 40.0% |
| Domestic Hygiene Pests and Refuse | 21.9% | 14.7% | 36.1% | 24.3% | 21.8% | 30.8% | 9.5% | 22.5% | 8.6% | 15.0% |
| Electrical Hazards | 55.3% | 40.2% | 56.1% | 54.1% | 56.8% | 52.1% | 32.6% | 54.2% | 27.3% | 50.8% |
| Entry by Intruders | 29.3% | 20.5% | 45.2% | 33.0% | 29.2% | 37.8% | 16.1% | 27.2% | 16.7% | 20.9% |
| Excess Cold | 54.0% | 41.5% | 61.4% | 53.9% | 55.9% | 58.2% | 41.8% | 50.9% | 45.9% | 52.1% |
| Falling between levels | 36.4% | 41.1% | 35.9% | 34.2% | 39.3% | 39.4% | 46.6% | 37.3% | 45.6% | 40.5% |
| Falling on level surfaces etc | 35.0% | 32.1% | 26.2% | 34.9% | 35.1% | 33.3% | 36.3% | 34.6% | 34.6% | 41.9% |
| Falling on stairs etc | 24.9% | 13.0% | 24.8% | 25.7% | 24.5% | 20.8% | 8.7% | 21.8% | 5.4% | 19.3% |
| Fire | 54.9% | 42.1% | 78.1% | 56.3% | 57.1% | 66.4% | 34.9% | 54.6% | 31.6% | 45.4% |
| Flames hot surfaces etc | 10.2% | 10.0% | 27.9% | 11.2% | 12.2% | 27.4% | 10.6% | 12.8% | 12.4% | 9.2% |
| Food Safety | 34.6% | 31.9% | 61.1% | 38.3% | 41.0% | 52.8% | 29.2% | 37.6% | 33.1% | 32.2% |
| Nitrogen dioxide | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Noise | 62.7% | 71.1% | 72.2% | 60.9% | 68.5% | 81.7% | 56.4% | 60.8% | 59.5% | 60.0% |
| Personal Hygiene Sanitation and Drainage | 32.5% | 25.1% | 53.7% | 35.4% | 35.0% | 46.3% | 20.8% | 33.4% | 21.4% | 25.1% |
| Structural Collapse and falling elements | 27.7% | 21.9% | 36.3% | 31.4% | 28.3% | 34.6% | 19.7% | 26.7% | 23.0% | 26.5% |
| Sulphur dioxide and smoke | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Water supply | 7.2% | 7.6% | 18.8% | 11.2% | 6.6% | 19.8% | 5.7% | 11.4% | 8.1% | 6.9% |

Where do we want to get to?

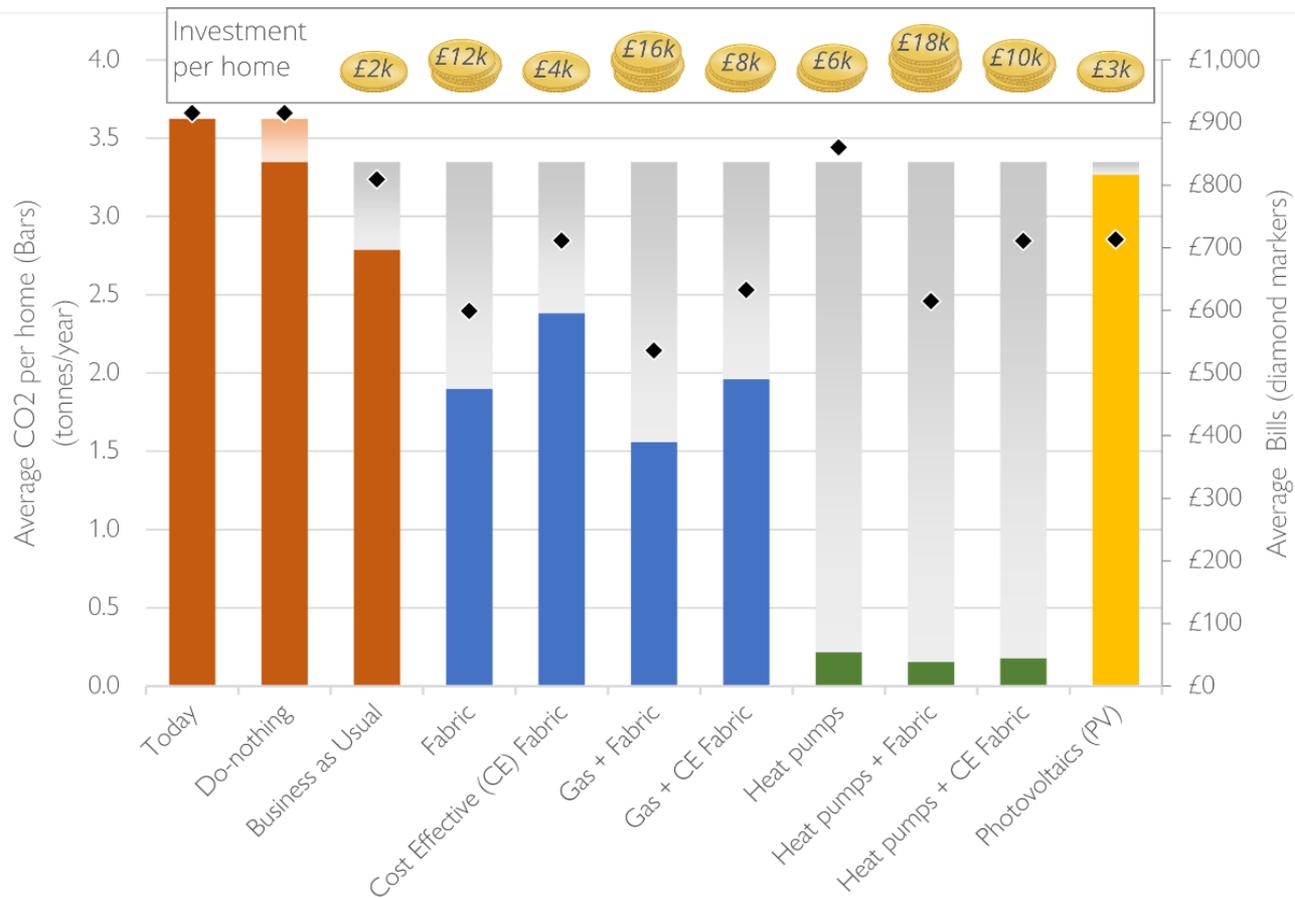
This was more difficult to define than expected.

Cannot be determined in isolation from national policy on:

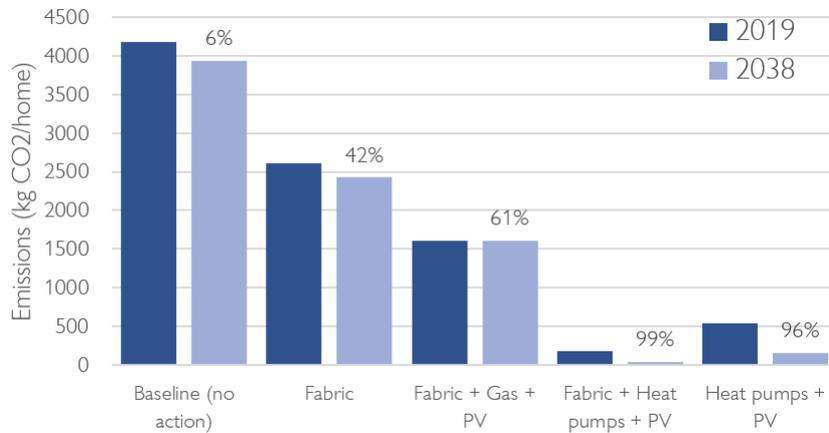
- Decarbonisation, capacity and resilience of future electricity grid
- Building infrastructure for new technology (e.g. Hydrogen)

Our analysis and literature review supports key conclusions in the next few slides

Where do we want to get to?



The shape of the problem



1 – There is no place for mineral gas in net-zero housing by 2038

2 – The electricity grid will decarbonize, key to CO2 reductions, but will not generate enough for old-fashioned electric heating

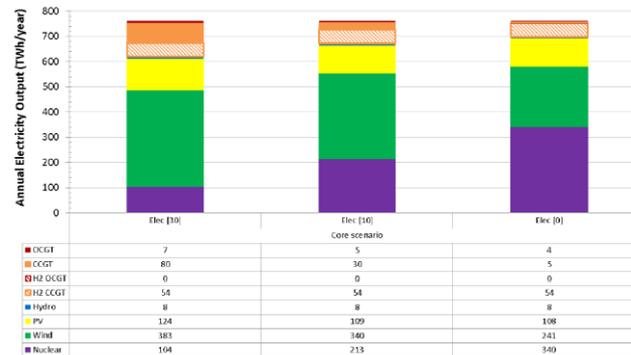


Figure 2-16 Optimised electricity production in Electric pathways

The shape of the problem

3 – Heat Pumps look likely to be key and their roll out needs to increase dramatically, noting that they may not reduce bills



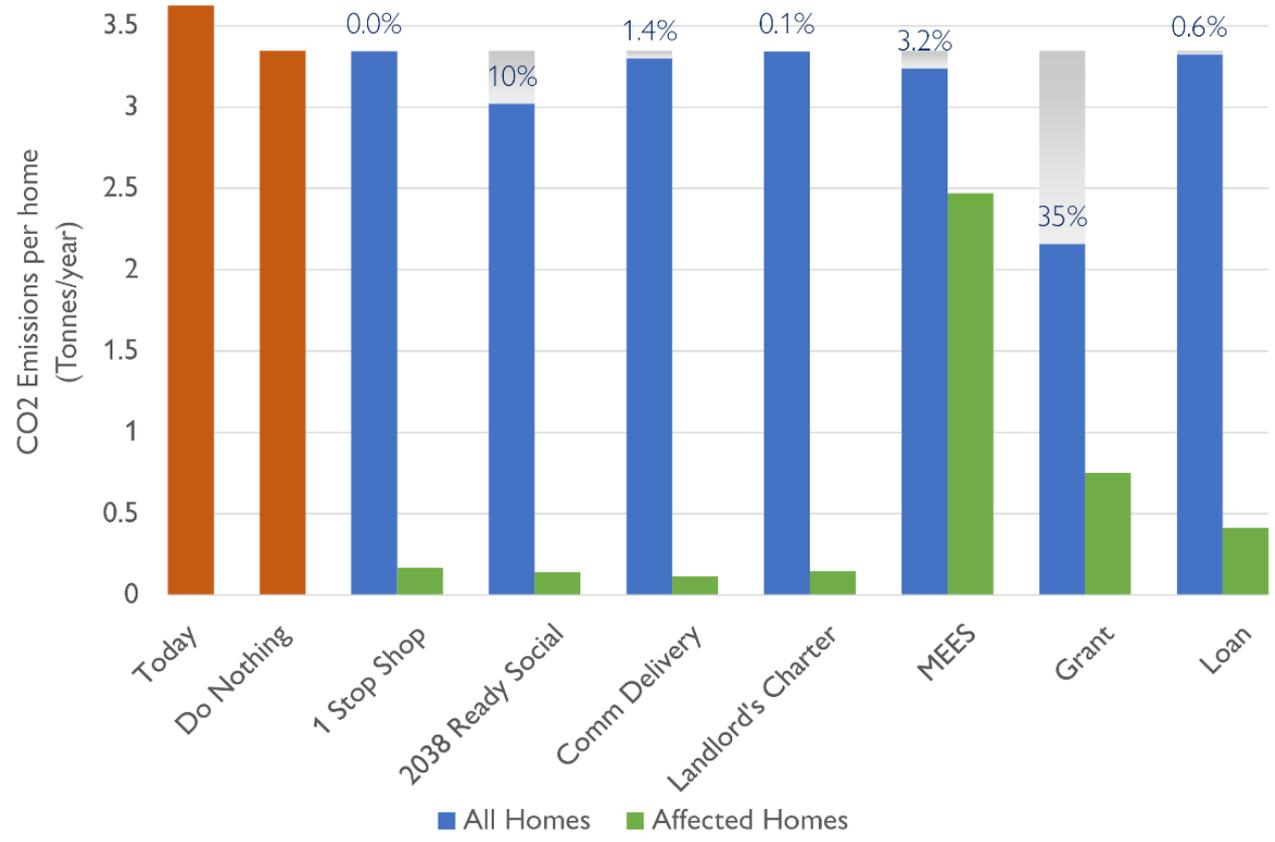
4 – we don't need every home to be super-insulated, but high and medium cost-effective measures are useful and low-regret

The shape of the problem

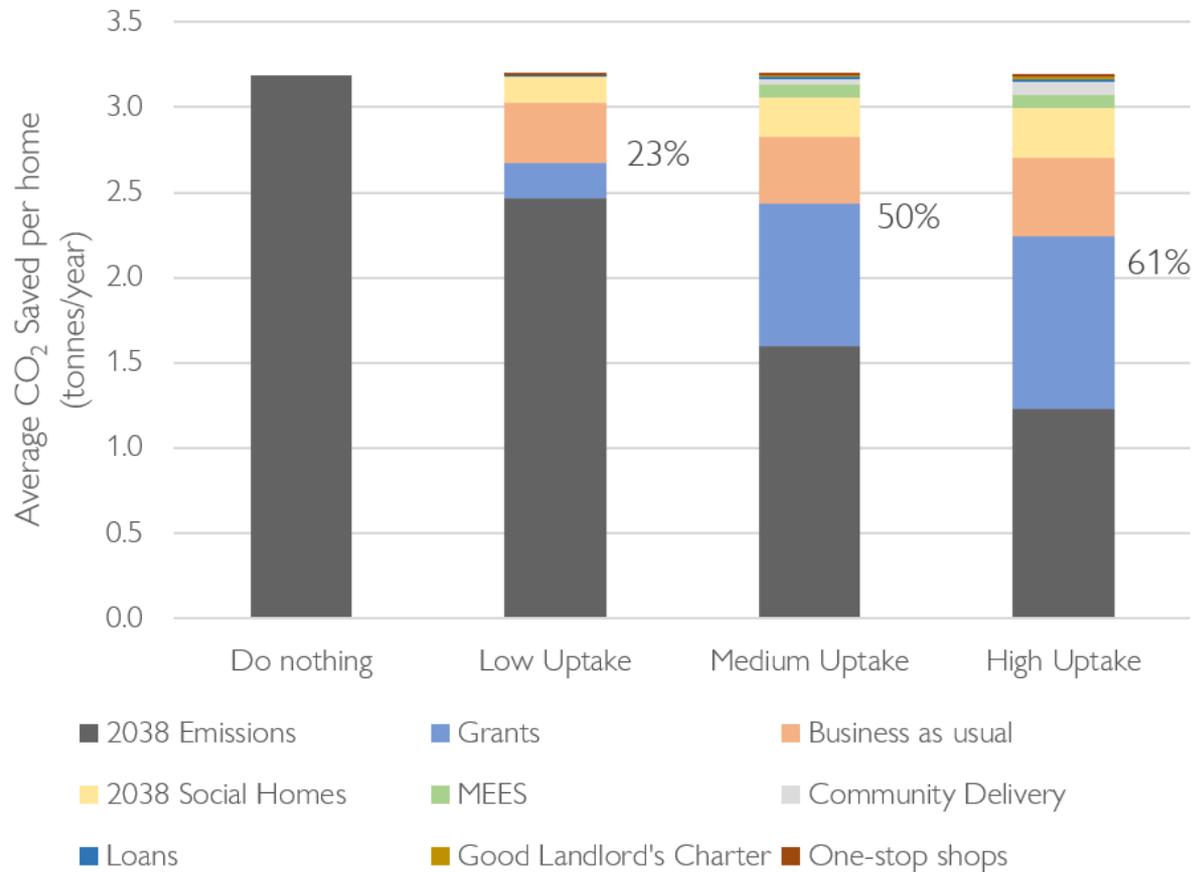
Cost of zero CO₂ energy supply is hard to quantify, but as we pay for supply side infrastructure through our bills (which seem likely to rise rather than fall), fabric measures that pay for themselves in their lifetime are cheaper than infrastructure.



How do we get there?



How do we get there?



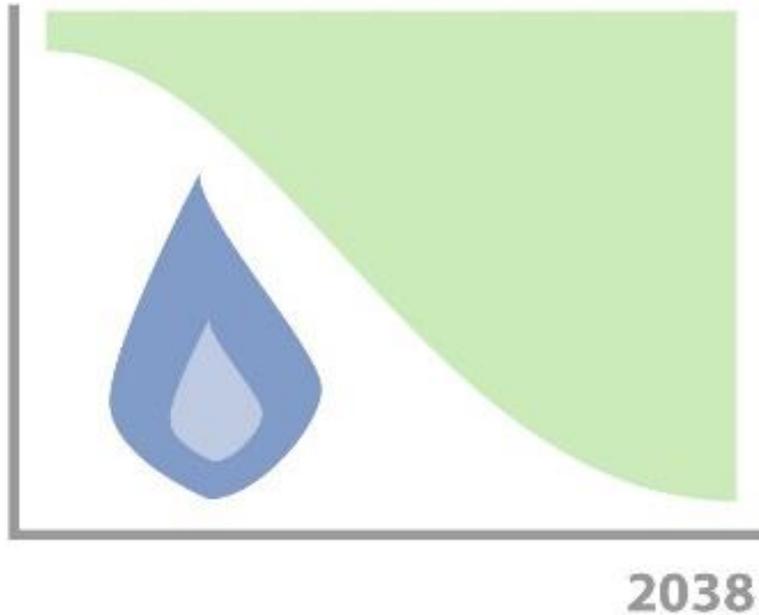
How do we get there?

From our scenario modelling ...

zero CO2 housing by 2038 is a **big** task. It needs bigger thinking than we have now



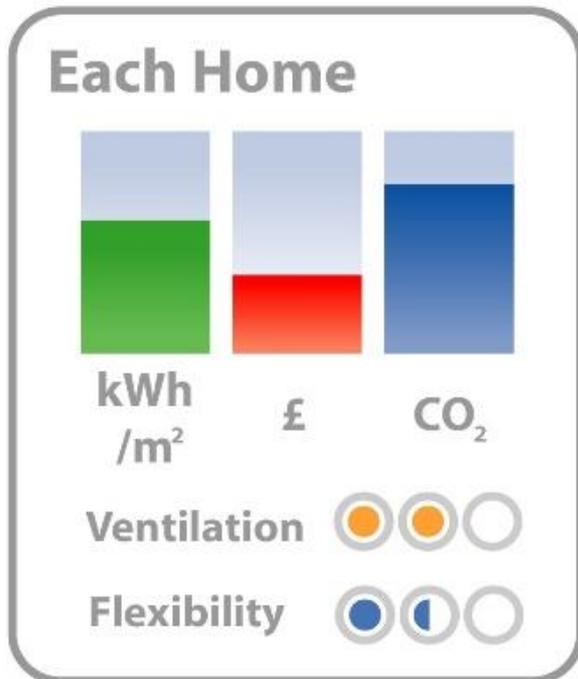
Key Conclusions



2038 is a 'boiler lifetime' away, and there is no place in Net Zero housing for gas heating

We must start now

Key Conclusions



Good future housing has several dimensions. We need a 'score card' to set decent targets.

- 'Smart, Healthy, Affordable and Grid-Friendly'

VS

- 'Stupid' Net Zero

Key Conclusions



We need to show how every home can best get to where it needs to be, without false or backward steps.

A simple plan for every home – just a list of measures in order that the owner/resident can plan to install eventually.

Key Conclusions



Many stakeholders are working towards Net Zero, and it is a complex problem and can be interpreted different ways.

GMCA is in a good position to **define the broad path** in the same way that it set the 2038 ambition.

David Shewan

Parity Projects