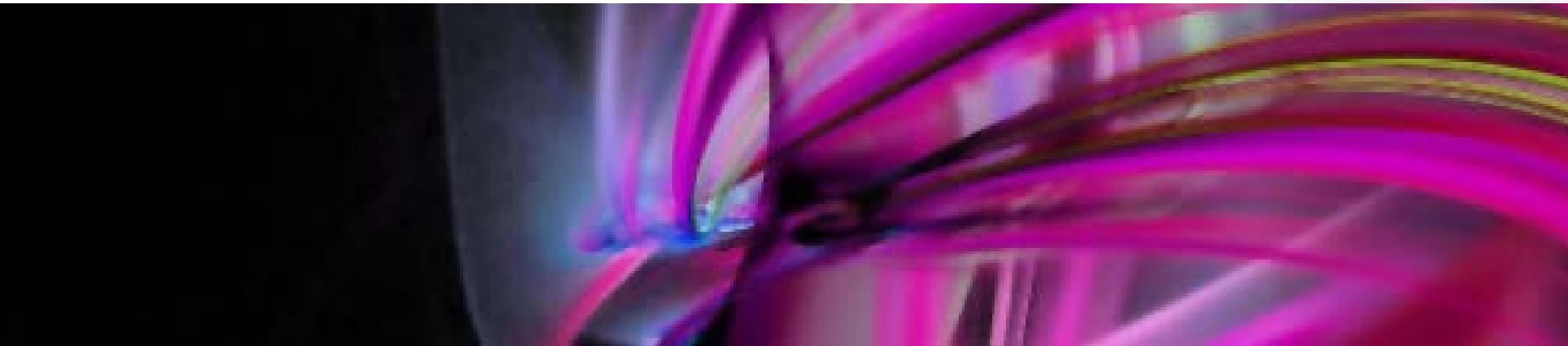
Technology Strategy Board

Driving Innovation

Retrofit for the Future

Ian Meikle, Leader Low Impact Buildings



Who are we?

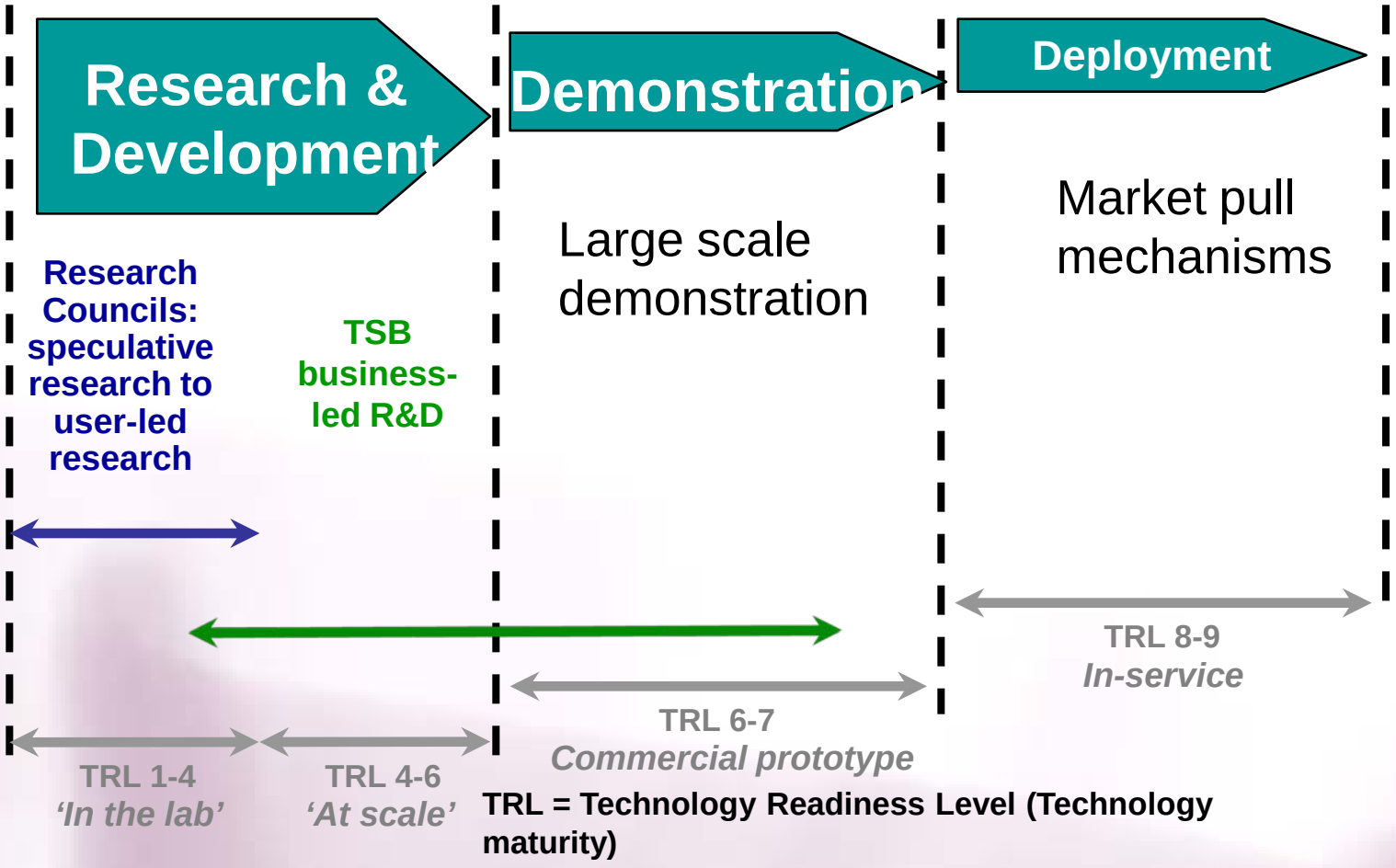
- A national body, funded by government, investing in business innovation
- Drawn from business
- Working across businesses, universities and government
- Investing £1bn over 3 years

Our vision

For the UK to be
a global leader in innovation

and a magnet for innovative businesses, where technology is applied rapidly, effectively and sustainably to create wealth and enhance quality of life.

Research & Development Pipeline

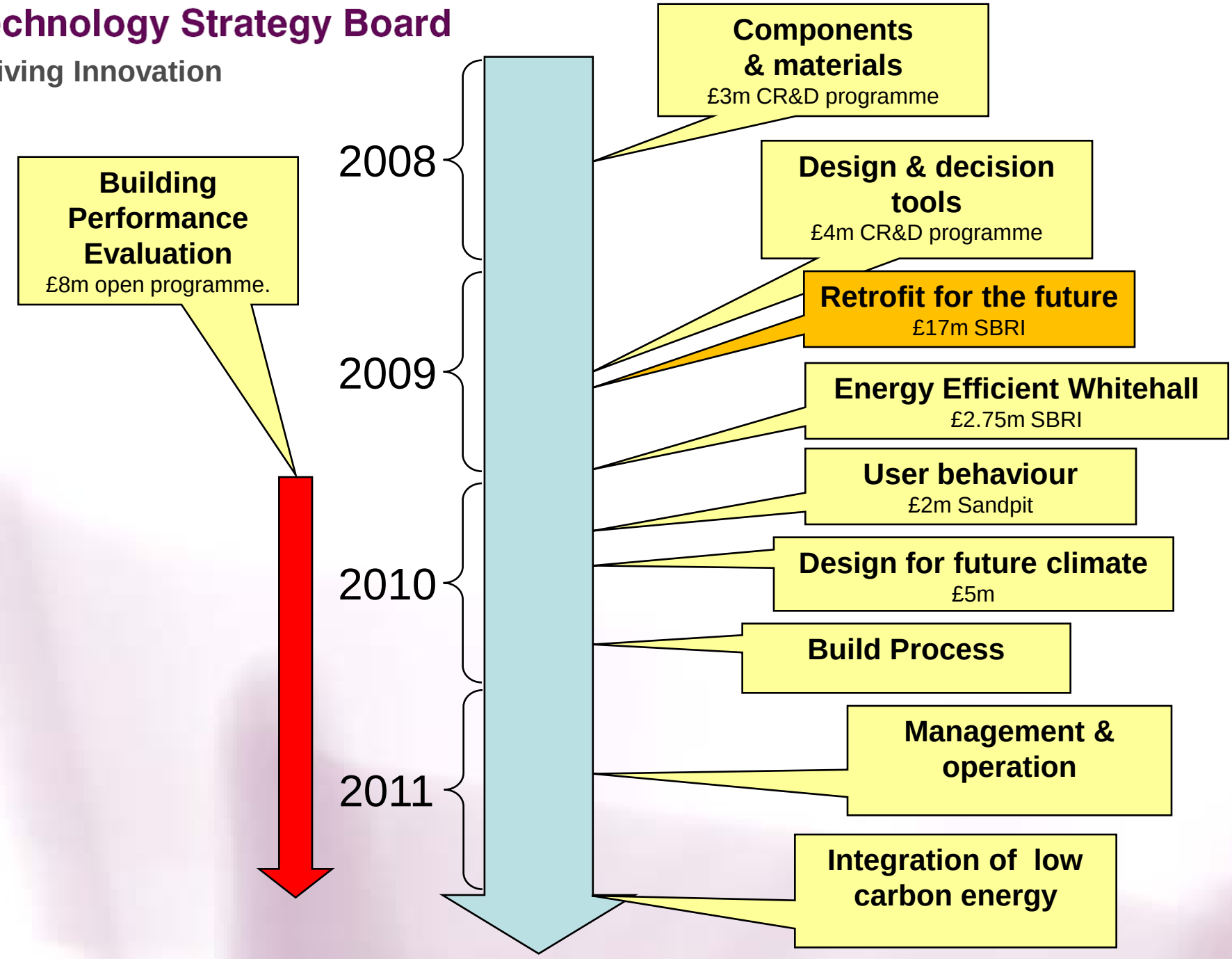


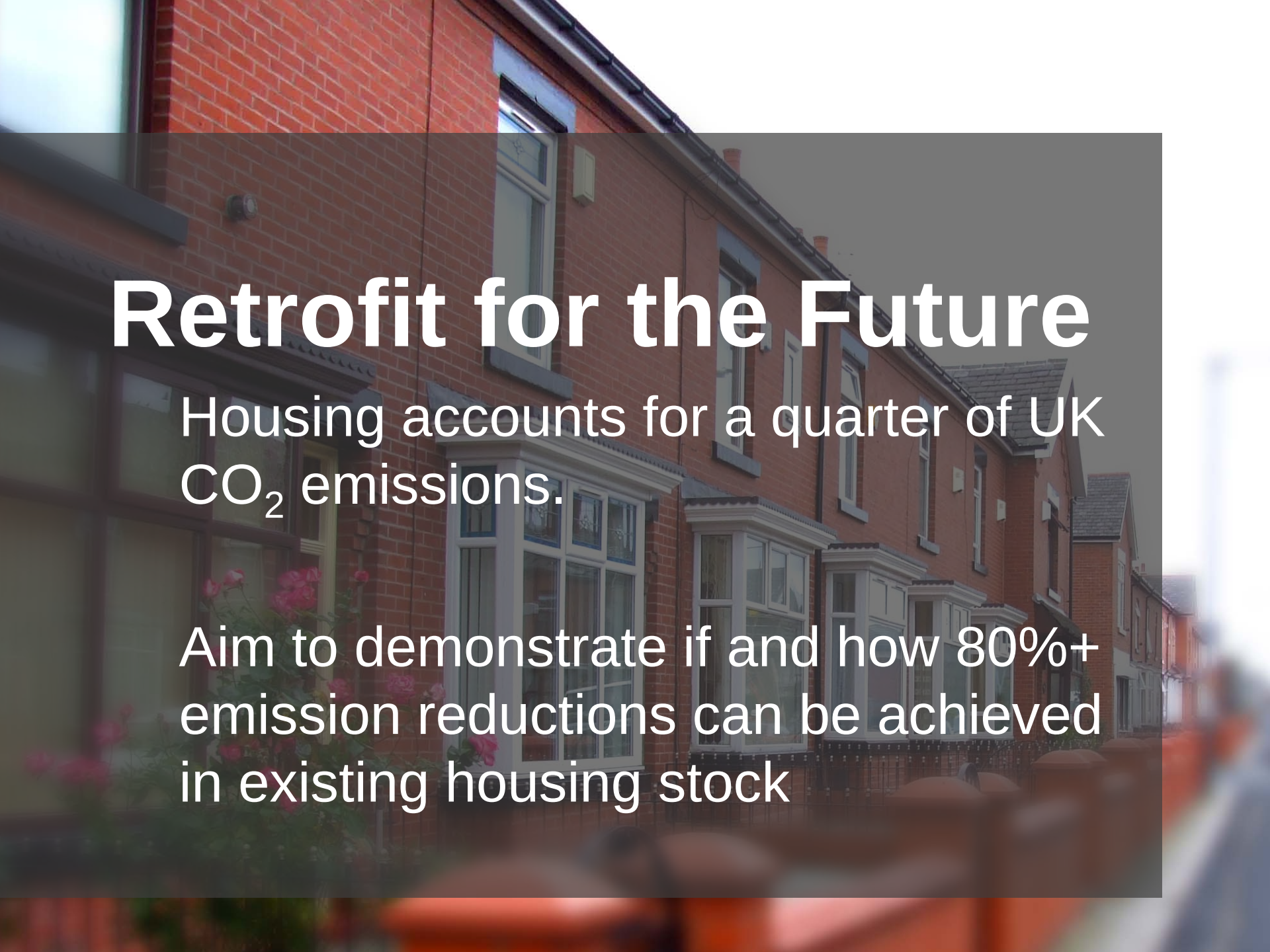
TRL = Technology Readiness Level (Technology maturity)


40% of all carbon emissions
in the UK come from buildings

Technology Strategy Board

Driving Innovation



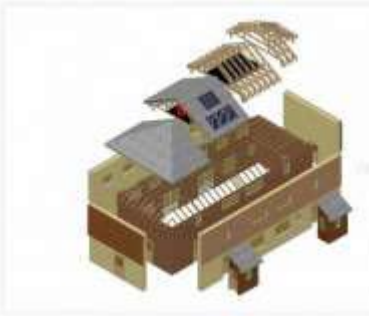


Retrofit for the Future

Housing accounts for a quarter of UK CO_2 emissions.

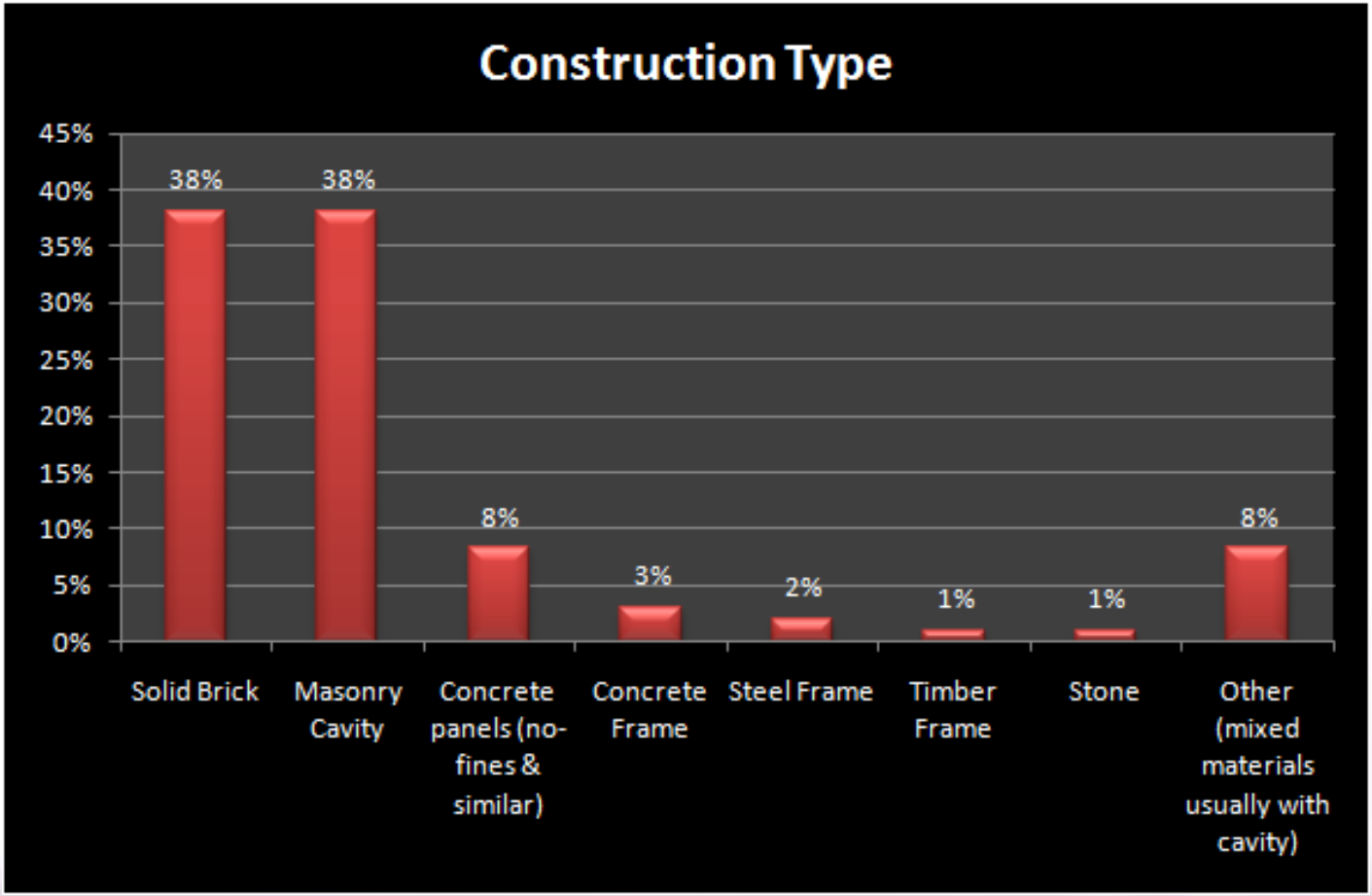
Aim to demonstrate if and how 80%+ emission reductions can be achieved in existing housing stock

Key Facts

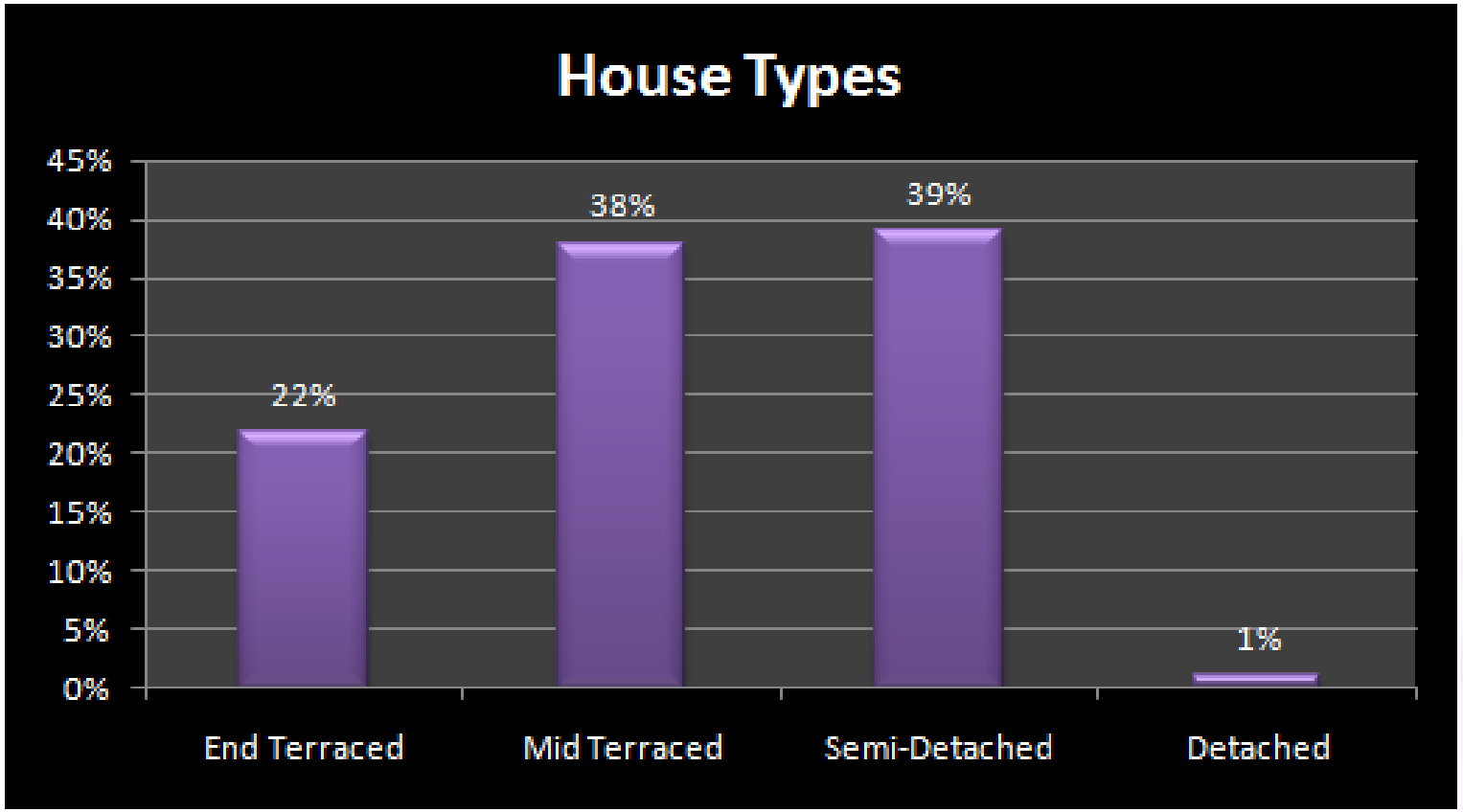


- National competition
- 86 projects covering a total of 119 dwellings
- £17 million of government funding
- Deep emissions cuts (~80%)
- Improved indoor comfort
- Social housing focus but lessons for all
- Spread of house types and technologies
- Monitored and reported!

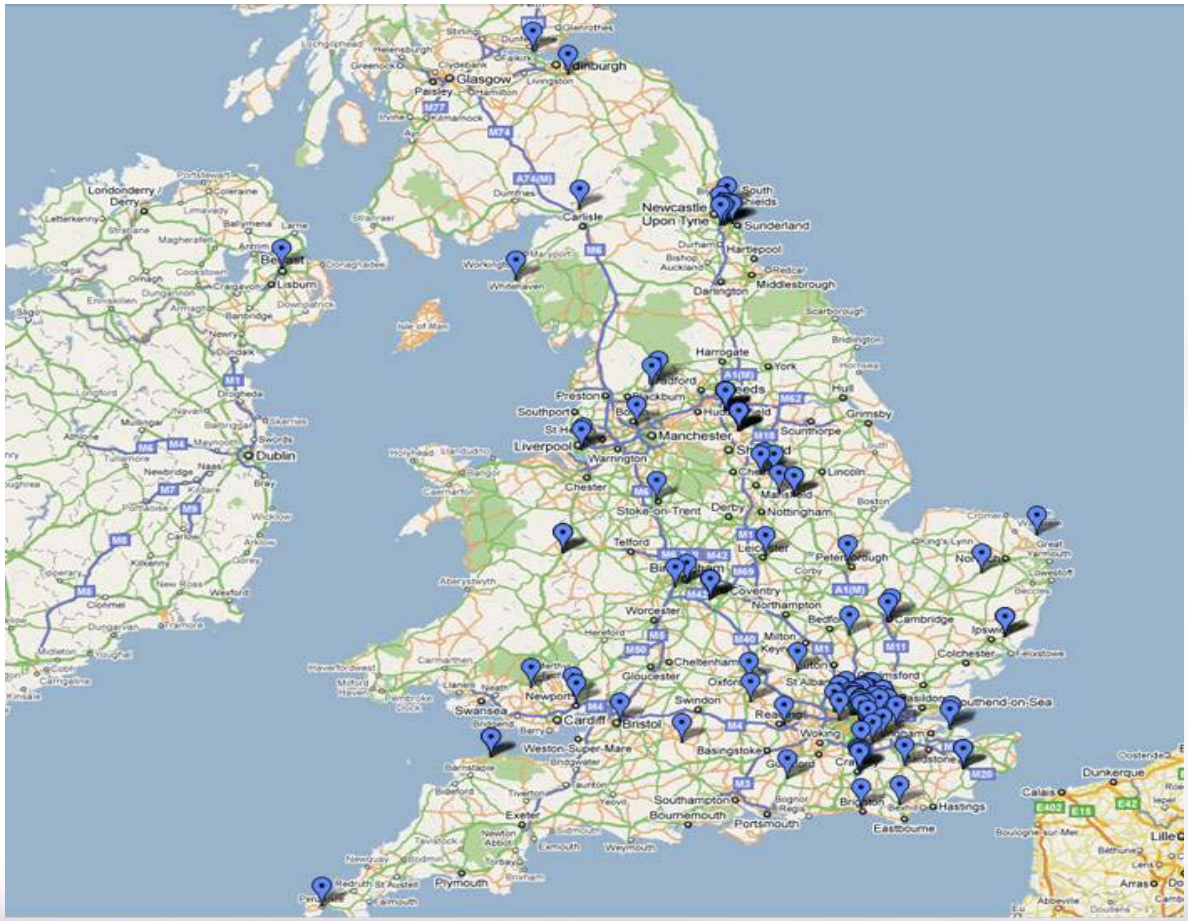
Construction Types



House Types


House Types
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
22%
38%
39%
1%
End Terraced
Mid Terraced
Semi-Detached
Detached

Geographical Spread



Progress to date

- *All pre-retrofit tests (air tightness and thermal image testing) have been completed*
- *Pre- retrofit tests not always possible*
- *20 out of the 119 retrofits complete and some collecting data already*
- *24 more to be completed by end of October*
- *Some slippage, as expected*

Technologies - Fabric

- *Cavity wall insulation*
- *External wall insulation*
- *Internal wall insulation*
- *Novel insulation materials*
- *Natural insulation materials*
- *High performance windows: - glass & frames*
- *Various approaches to air-tightness*

Technologies - Services

- Mechanical ventilation with heat recovery
- Solar water heating
- Solar space heating with storage
- Micro Combined Heat and Power
- Biomass CHP
- Solar PV
- Fuel cells

Technologies – Controls etc.

- *Integrated controllers*
- *Smart meters*
- *Smart appliances*
- *Self-learning controllers*
- *Occupant training (energy management and sustainable living)*

Main Challenges

- Application of established technologies (eg internal and external wall insulation) in a range of empty and occupied house types
- Integration of novel technologies with existing fabric and services
- Achieving energy savings, improved indoor comfort and occupant satisfaction (control and manageability)

Monitoring and Reporting

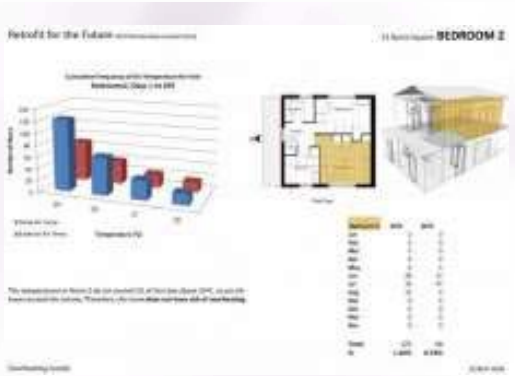
- *Pre-retrofit tests and measurement*
- *Construction monitoring*
- *Post completion tests and walk-through*
- *Occupant satisfaction surveys*
- *Ongoing monitoring of energy, comfort and technology performance*
- *Data and results available in non-attributable form via web portal*

Example: Cambridge City Council

"Our aim was to develop an energy reduction solution that was **innovative yet replicable and economically viable**. It's important that we try to resolve the lessons learnt through this project as we **need to start the mass retrofit revolution** very soon, in order to meet the Government's 2050 targets."

Andrew Mellor

PRP's Environmental Director



Example: Bristol

"We are very aware of the **significant social challenges** faced by people on low incomes and understand that a low carbon lifestyle may not be their greatest concern. Our scheme makes use of effective sustainable technologies that are **simple and robust** enough to fit into people's daily routines. By making it easy for residents to **adopt slightly different habits**, we hope they will become generally more engaged with low carbon lifestyles".

Craig White

Director, White Design

weblinks

- http://www.retrofitforthefuture.org/
- http://retrofitdiaries.org/

Summary

- *First major demonstration of very low carbon housing retrofit in the UK*
- *Covers a wide range of house types, construction technologies, property age and retrofit technologies*
- *Focus of buildings and occupants*
- *Monitored and Reported!*

Technology Strategy Board

Driving Innovation

www.innovateuk.org