



Deep carbon emission reductions in existing UK social housing: are they achievable, and how can they be funded?

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Contents

- Context and motivation
 - Social housing, Peabody case study
- Methods
 - Modelling energy use and costs
 - Refurbishment approaches
 - Scenarios
- Results
 - Carbon emissions
 - Costs
- Conclusions
- Questions and comments



Context: Social housing and CO₂ emissions

- Social housing
 - provided at a low cost for those in need
 - around 20% of existing UK housing stock
- 27% of UK carbon emissions from housing
 - (excluding aviation and shipping)
- UK commitment to 80% cuts in carbon emissions by 2050
 - London target of 60% cuts by 2025





Case Study: Peabody

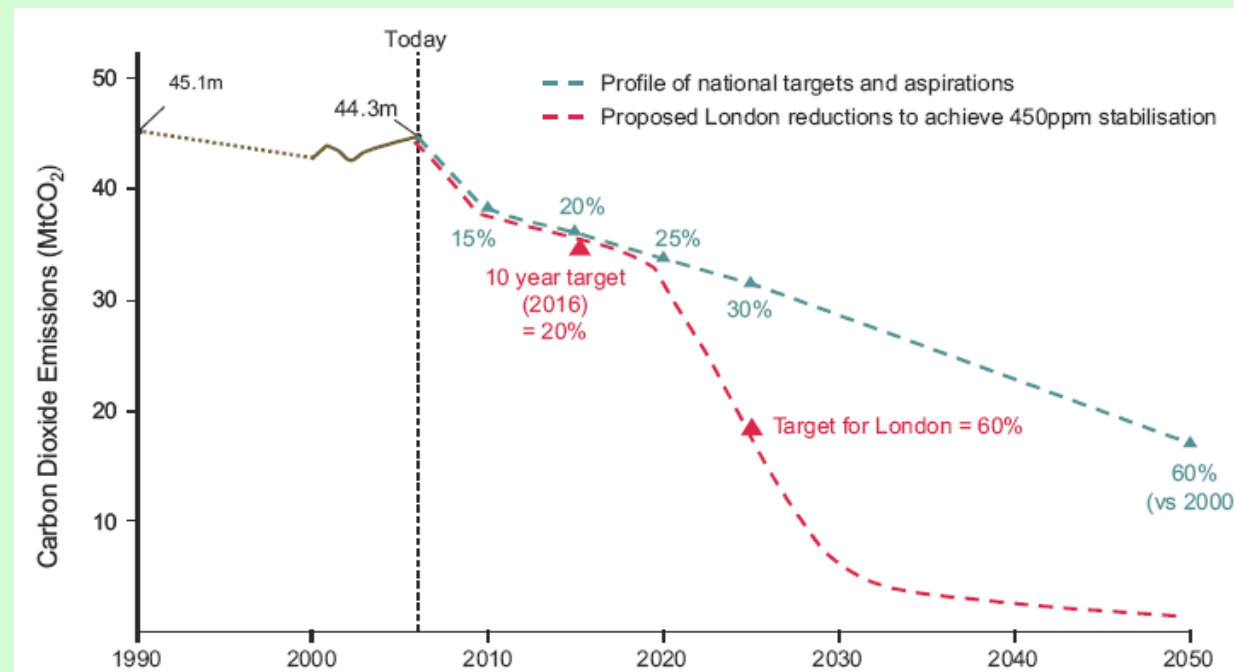
- Large housing association operating in London
 - 18,000 homes on 191 estates
- Challenging to refurbish
 - More than half with solid walls
 - 45% listed or in conservation areas
- Research background
 - Since 2003, research on long-term stock options
 - Recommendations: communal heating; solid wall insulation; PV
- Aim: assess the viability of achieving deep emission cuts





Assessing progress

- London climate change action plan target
 - “60% by 2025”
 - Step on way to reductions beyond 80% by 2050
- Put forward as a minimum level of action
- Also assessed viability of achieving zero-carbon by 2030





Modelling energy use and costs

- A model of Peabody stock
 - considering energy use, carbon emissions, resident fuel bills, refurbishment costs
 - from 2006 to 2030
 - developed using spreadsheet software (MS Excel)
- Energy use
 - based on BREDEM
- Economic appraisal
 - discounted annual cash flows
- Full details in “Towards a Low-Carbon Peabody” report



TOWARDS A LOW-CARBON PEABODY:

Exploring the viability of achieving deep carbon dioxide emission cuts from existing Peabody homes

A report for Peabody's 21st Century Communities project



Andrew Reeves
Institute of Energy and Sustainable Development, De Montfort University



Refurbishment Approaches

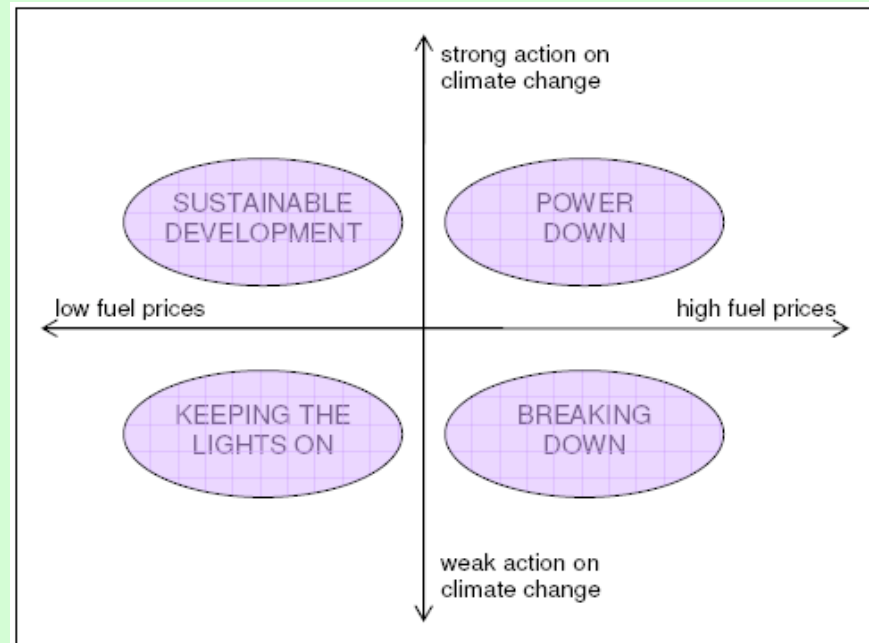
- Four initial approaches:
 - Base
 - current projected refurbishment
 - Fabric
 - as above, with solid wall insulation, double glazing, ventilation
 - Communal
 - as for Fabric, with district heating connections for up to 20% of estates; gas-fired CHP for blocks of flats
 - Renewables
 - as for Communal, with solar thermal for houses and top floor flats; solar PV for all remaining suitable roof-space
- Then variations, including other technologies, to meet 2025 target





Scenarios

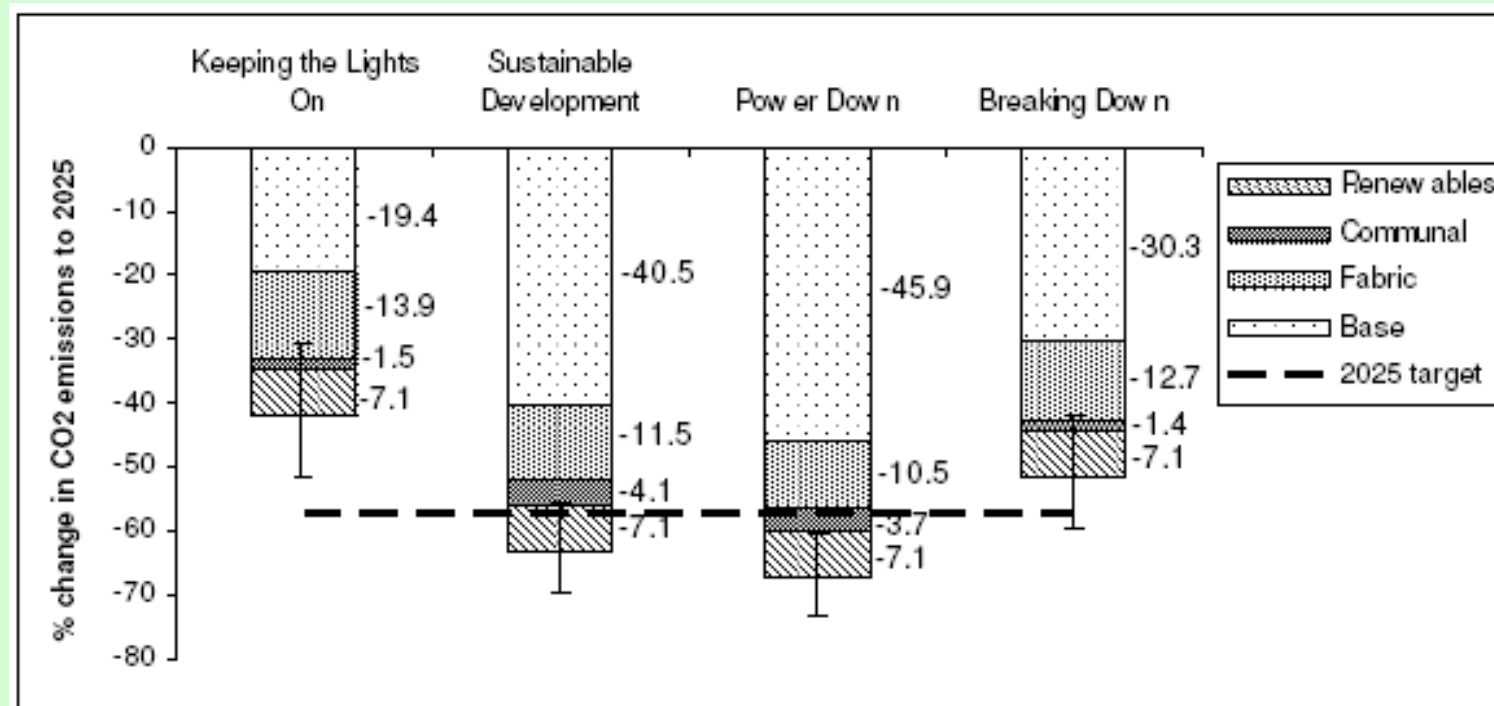
- Four scenarios
 - Defined by fuel prices and action on climate change
- In strong climate action scenarios:
 - reduced demand for energy
 - up to 20% less
 - increased electricity from renewables
 - from 5% today to around 50% by 2030
 - financial support for refurbishment
 - grants for up to 30% of costs, incentives for micro-generation





Results: London 2025 target

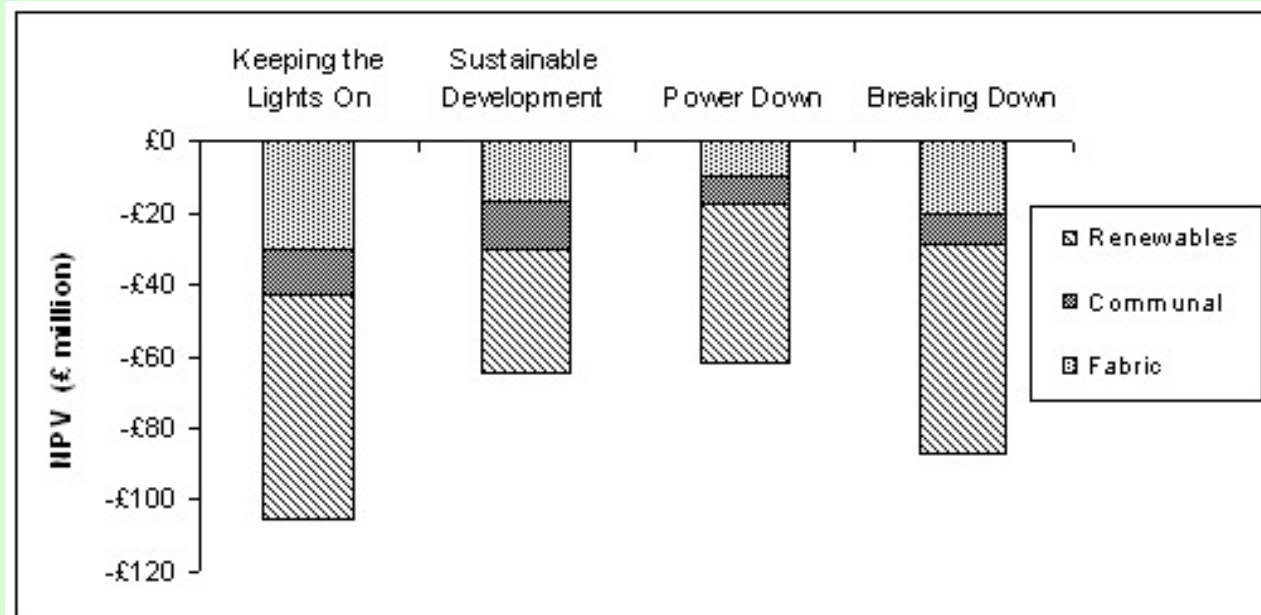
- Achievable, but...
 - without external change the most extensive approach is insufficient
 - extensive refurbishment required
- 2025 target only achieved with a good degree of confidence in the Power Down scenario





Financial case

- Extra spending beyond base case to 2030 of £70m to £160m.
 - About £40m in grant funding
 - Significant uncertainty of +/- £40m
- Net Present Value (NPV) calculated for Peabody and residents
 - always negative – resident benefits do not outweigh extra costs





Funding gap

- Tens of millions of pounds extra funding required
 - Despite substantial financial support
 - 20% of estates refurbished at no cost to Peabody
 - 30% grant support for micro-generation
 - feed-in tariffs reward electricity exports from PV
- Bridging the gap
 - increased rents or charges
 - increased sales of units
 - further grant funding
- For Power Down scenario
 - annual rent increases of 0.2% to 0.9% (increase of 4% to 19% by 2030)
 - 210 to 730 units sold (up to 4% of stock)



Results by stock type

- Greater % reductions in older homes
- 2025 emission levels very similar
- Implies greater % reductions needed for landlords with older stock?
- Conversely, lower % reductions for social housing on grounds of equity?

Stock Type (and % of stock)	2006 emissions per home per annum (tonnes)	2006 annual emissions per resident (tonnes)	Emission reductions to 2025 (PD scenario)	2025 annual emissions per resident (tonnes)
Modern (14%)	2.5	1.4	48%	0.7
Recent (14%)	2.8	1.4	57%	0.6
Old (51%)	3.7	2.2	74%	0.6
Electric (3%)	4.0	2.4	70%	0.7
Scattered (18%)	4.8	2.0	63%	0.7
Peabody Average	3.6	1.8	67%	0.6
UK Average	6.1	2.7	N/A	N/A



Conclusions

- GLA target can be met
 - requires reduction in carbon intensity of grid
 - energy demand stabilising or declining
 - extensive refurbishment, new responsibilities for landlords
- Costs are prohibitive at present
 - the “win-win” associated with low-cost measures doesn’t apply
 - stock sales, rent increases or substantial grant funding likely to be required
- Apportioning responsibility
 - greater reductions for older stock?
 - contribution of social housing sector?
 - onsite or offsite renewables?



Thank you!

Any questions or comments?

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