



Energy

How can we engender and embed low-carbon pathways and engineering solutions to reduce energy demand and power generation in cities?



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What we're doing

We are developing energy models for low-carbon intervention paths that are scalable (i.e. from building to city scale) as well as take time and cost into consideration.

How we're doing it

We are developing a generic modelling approach to quantifying the emissions reductions from energy efficiency measures at the small area scale. Initially, this is focussed on the domestic sector, but will be broadened to encompass the non-domestic and transport sectors. Socioeconomic factors also will be considered in the assessment of carbon and energy savings.

We are testing the hypothesis that an intervention targeted at changing attitudes and behaviours can cause a significant decrease in transport and home energy use at the household scale over an extended period.

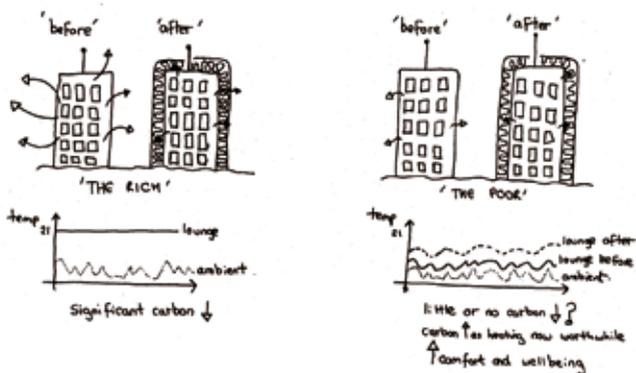
We are determining the relationships between changes in energy use and changes in wellbeing over time.

Who's doing it

University of Southampton: Prof. AbuBakr Bahaj, Prof. Jane Falkingham, Dr. Milena Buchs, Dr. Luke Blunden, Dr. Patrick James, Duygu Cihan, Mamusu Kamanada, Philip Turner, Phil Wu

What we've found out

- People on a low-income budget who live in social housing in a large block of flats in Portsmouth limit their spending on energy to the point where the indoor temperature in their home is below accepted norms used in thermal modelling.
- In a separate study in Southampton concerning tower blocks with communal heating, energy consumption rose significantly in blocks that had energy-saving features retrofitted, compared to identical blocks left unrefurbished.



- There is a positive correlation between the level of energy use and subjective health status, but there is no correlation between the change of energy use and health status.
- GIS mapping of available data has demonstrated an ability to estimate the main, thermally-relevant parameters of building stock, such as total floor area.

Next steps

We plan to recruit 200-250 households in Southampton and carry out initial householder interviews.

We will set up the infrastructure necessary to acquire and analyse monitoring data.

We will install equipment to monitor home energy use for a baseline period as well as use GPS trackers and travel diaries to monitor baseline travel patterns.

Find out more

- Wu Y, Blunden L, Bahaj AS. Assessment of Building Refurbishment and the Impact on City-Level Space Heating Energy Consumption. Under review.
- Blunden L. Liveable Cities Programme. Sustainable Housing Action Partnership (SHAP) conference, Birmingham, 17 February 2014.
- Dimitriou T, Teli D, James, PAB, Bahaj AS, Ellison L, Waggott A. Impact of Current Occupant Behaviour on Potential Carbon Savings in a Council Owned Tower Block Undergoing Retrofit. CIBSE National Conference, London, April 2014.

