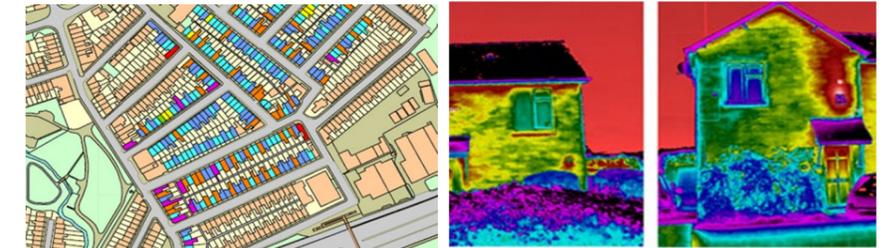




DECoRuM carbon mapping

- GIS-based, carbon-counting model, DECoRuM will underpin the carbon mapping in the 6 communities.
- Ordnance survey maps, walk-by surveys, Google street view and energy questionnaires to develop a baseline carbon map.
- Gas and Electricity consumption data will be used to validate the model.



DECoRuM thematic map showing annual CO₂ emissions for a Bicester neighbourhood. Example of Thermal Imaging for houses (fabric testing)

Aim of the household level research

- Measure, monitor and map the impacts & effectiveness of the low-carbon interventions.
- Assess the interaction between user behaviour and physical aspects of housing performance in relation to energy use.
- Provide near real-time feedback on energy consumption and energy reduction using carbon mapping, to investigate the effect on inhabitants' habits, behaviour and practice.
- Establish the actual energy savings to inform future policy formulation and strategy implementation.
- Bring out differences and limits in household and community level approaches to changing energy behaviours.

Monitoring & Evaluation

Evaluating the energy use of three groups of thirty households each (90 households across six low carbon communities)

The study adopts a mixed method approach that involves the use of a variety of data sources, collecting both quantitative and qualitative data for households.

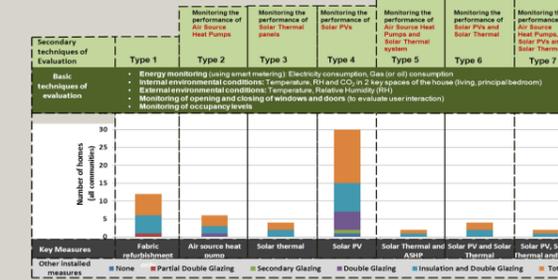
The elements of the study are:

- Carbon Mapping to predict and visualise expected energy and CO₂ savings from low-carbon interventions
- 'Monitoring and evaluation of household energy use'
- Mapping and communicating monitored information through a web-based dynamic community monitoring toolkit
- Energy display library and trials
- Social network analysis

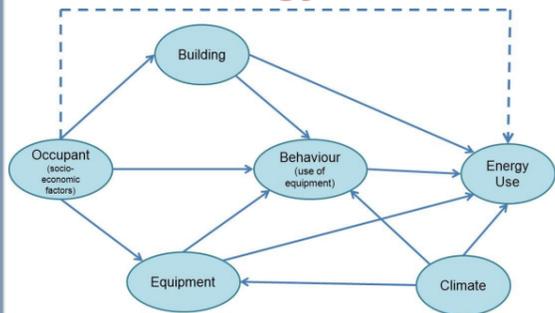
In-Use Monitoring of Group A houses

'In-use' continuous (using smart meters) monitoring (over 2 years) for 30 Group A households Purpose of household-level monitoring is

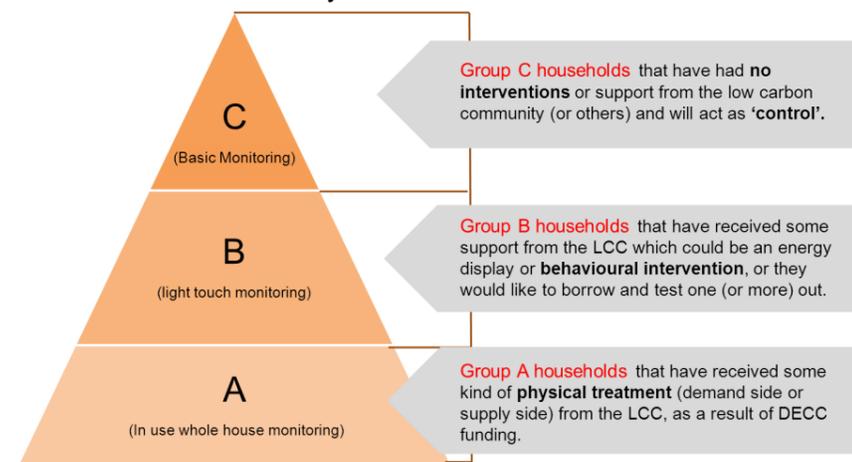
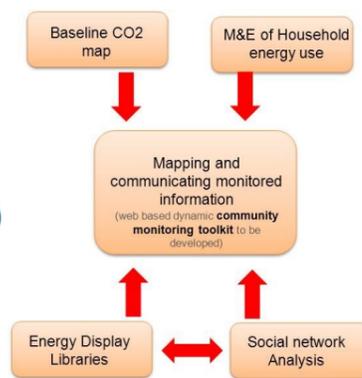
Monitoring protocols for EVALOC households



Methodology



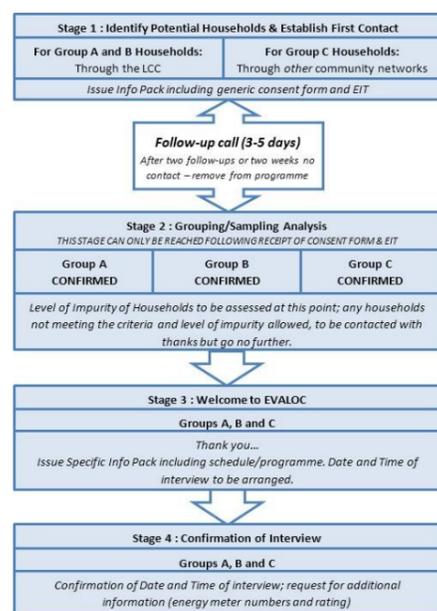
Relationship between key determinants of domestic energy demand. Source: Steemers and Yun (2009)



The study adopts a **mixed method approach** that involves the use of a variety of data sources, collecting **both quantitative and qualitative data** for households. The elements of study are: **Carbon Mapping** to predict and visualise expected energy and CO₂ savings from low-carbon interventions 'Monitoring and evaluation (M&E) of Household energy use' in three groups of households for the six household communities **Mapping and communicating monitored information: Web-based dynamic community monitoring toolkit** to be developed **Energy display library and trials** **Social network analysis**



Above: Energy Displays Monitors Left: An example of Social Network



- Recruitment to get an equal distribution for the three groups identified was challenging and required a four stage approach.
- The recruitment of households to specific groups was based on information collected during initial stages

Emerging Findings

- **Action research approach** appropriate for the evaluation and improvement of energy use in a community and Household level. (Need for frequent negotiation and adjustment.)
- Leads to **co-production of evidence-based knowledge** on energy reduction by Communities and Universities
- In case of EVALOC, both **methods and approaches** (evaluating impact of community events, monitoring and survey of household energy use, energy display libraries) as well as **research outputs** (energy monitoring and mapping toolkit) are relevant for communities.
- Use of feedback at a **number of levels** tends to develop a **shared language**, based on **experience** and 'reality checks'.
- Understanding of **resident behaviour** could be used to inform briefing and solutions for low carbon refurbishment of UK homes

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