ENERGY USE IN BUILDINGS

This theme is made up of the multi-disciplinary Urban Energy Research Group (UERG), with a particular emphasis on energy use in buildings but with research that has relevance to energy demand and supply in a wider context. The group is led by Professor Phil Banfill.

UERG was formed in 2004 with a wide-ranging remit to investigate sustainability in the built environment. It therefore comprises engineers, social scientists, economists and statisticians and has links with other research institutions in the University. This includes involvement with the pan-University Energy Academy at Heriot-Watt, a more general energy-related research initiative. Our researchers have been involved in a range of research projects, with funding from both research councils and industry, and also several consultancy projects. Output has been used by DCLG, DECC and Scottish Government reports on a range of policy issues within the field of energy and buildings.

Specific research areas currently being investigated by our members include:

• Low carbon refurbishments for existing buildings in domestic and non-domestic sectors

• Challenges for new-build low-carbon buildings

• Climate change adaptation

• Building simulation and modelling

• Thermal comfort

• Socio-economic barriers to achieving low-carbon targets in the building sector

• Fuel poverty in UK homes

• Micro and small-scale energy generation

• Identifying trends and behaviour from building energy performance data

• Embodied energy and embodied carbon associated with building construction

CASE STUDY

Low Carbon Futures

(Engineering and Physical Sciences Research Council (EPSRC))

As part of the EPSRC-funded Adaptation and Resilience to Climate Change (ARCC) Network, this project combined detailed building simulation and future climate projections to provide a series of outputs, including an overheating risk tool, for assessing the future performance of buildings in the UK. The LCF tool incorporates the 2009 UK Climate Projections and generates multi-climate building performance estimations from just a single simulation output (from typical energy performance software). The result is a spectrum of probabilities suggesting how that specific building might perform in the future. This will help the user, who would typically be a member of the design team, to choose adaptation technologies that might reduce the risk of overheating. The LCF tool has been tailored to the needs of design practitioners and can be applied to the simulation results of any building. The summary report of the project can be downloaded from our website at

http://www.hw.ac.uk/mediaservices/pageflip/SBE/Low_Carbon_Futures_report/

The project exemplifies the bottom-up modelling approach adopted by the research group. Other projects with a similar approach include Tarbase which investigated technical, economic and social factors associated with retro-fitting domestic and non-domestic buildings types for deep-cut carbon-savings, Adaptation and Resilience In Energy Systems (ARIES), led by the University of Edinburgh and looking at the implications of future climate and energy demand changes on the energy and thermal performance of the built environment, and Consumer-Appealing Low Energy Building Retrofitting (CALEBRE), led by Loughborough University and studying technologies for solid wall dwellings. In every case, the use of industry partners is used to translate the work to areas where it can have maximum impact.

KEY PEOPLE

Professor Phil Banfill, Dr David Jenkins, Dr Gillian Menzies, Dr Mehreen Gul, Dr Sandhya Patidar, Ms Sophie Simpson