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Assessing the performance of domestic heating controls in a whole house test facility

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Title:

Assessing the performance of domestic heating controls in a whole house test facility

Abstract:

The energy consumed by domestic space heating systems represents a considerable share of the energy consumed in the UK. At the same time up to a quarter of English homes have inadequate controls on the central heating systems. Current modelling tools, and results from the limited field trials that have been carried out, are problematic due to the influence of the behaviour of occupants and variability of weather conditions.

The Salford Energy House is a full-sized end terrace house built within a climate controlled laboratory. This allows a house of typical construction to be extensively analysed while completely disconnected from the unpredictability of weather conditions and human behaviour.

This paper presents a series of tests carried out in the Salford Energy House into the effectiveness of installing room thermostats and thermostatic radiator valves (TRV)s. Savings of 40% in terms of energy consumption, cost, and CO₂ were achieved. The results should be regarded with caution in terms of their extent and application to real homes, but represent a significant contribution to the gap in current knowledge due to the ability to isolate the performance of homes from uncooperative variables, and a potential base for the development of more effective modelling tools.

Practical Application:

This research provides evidence to support installation and use of room thermostats and Thermostatic Radiator Valves as an effective means of reducing domestic energy consumption and overheating.