

'Chariot' on course to deliver healthier homes and lower energy bills

December 2 2016

Successful trials of Chariot, a unique new system that simultaneously records temperature, humidity and energy use in the home, have opened the way for low-income households to save money while reducing risks to their health.

Harnessing Internet of Things technology, the system generates easy-to-use data that can help local authorities, housing associations, energy suppliers, health authorities and others to target and tailor the energy advice they give to vulnerable people.

As well as revealing under- or over-heated parts of a home, Chariot enables energy advisors to pinpoint where and why damp or mould may pose a problem. They can then suggest, for example, ways of using heaters more efficiently and cost-effectively, blocking draughts and eliminating dampness through better ventilation.

The Engineering and Physical Sciences Research Council (EPSRC) has funded the development of Chariot by Southampton and Nottingham universities and the Centre for Sustainable Energy (CSE).

Each Chariot kit includes three small wireless sensors that regularly record the temperature and humidity in the rooms they are placed in, and wireless devices that monitor gas and electricity consumption. Data is forwarded to and kept securely on a remote computer server accessed via the internet (i.e. it is stored in 'the cloud'), and later analysed via tablet or computer using a simple-to-use web-based interface.

Chariot has now been trialled in over 20 low-income homes. A user guide helps energy advisors to make the most of the graphs and tables that the system generates and to provide tips geared to individual households' needs – including measures as simple as fitting thicker curtains or loft insulation, or improving air circulation. Of potential value to all households and not just low-income ones, Chariot is now being promoted to potential user organisations across the UK and the team are exploring ways of adding further functionality.

Cold or damp can exacerbate medical conditions ranging from colds, flu, arthritis and asthma to chronic [obstructive pulmonary disease](#) (COPD), circulatory diseases and mental illness. In total, nearly 1 million people in the UK suffer from COPD, for example, while cardio-vascular disease causes 42,000 premature deaths a year. People in the coldest houses can be most at risk.

Dr Enrico Costanza, who led the research while at the University of Southampton, says: "Chariot is the only system of its kind that collects data on temperature, humidity and energy use (and therefore CO2 emissions) all at the same time. It makes it easy for advisors to understand what's going on energy-wise in a house, to make the householder aware of what the problems are and ultimately to get their buy-in to make the necessary beneficial changes."

Dr Nick Banks of the CSE says: "It's not just a question of cutting energy use and greenhouse emissions. By giving energy advisors a tool that allows them to inform themselves and then sit down with a householder and talk through problems and solutions, it offers a very practical route to making wiser energy choices and therefore improving quality of life and enhancing health among vulnerable and low-income groups, who often suffer serious health impacts due to cold and damp homes."

Dr Joel Fischer, from the School of Computer Science at the University of Nottingham, says: "The development of the Chariot system was only possible due to the close collaboration with CSE [energy](#) advisors and their clients, for which we are very grateful. The advisors provided us with insight into their working practice, which enabled us to co-develop a system that responds to their needs, and their clients kindly let us into their homes to trial the system in real use contexts. It is this collaborative approach that made the project a success."

Provided by Engineering and Physical Sciences Research Council

Citation: 'Chariot' on course to deliver healthier homes and lower energy bills (2016, December 2) retrieved 13 March 2024 from <https://phys.org/news/2016-12-chariot-healthier-homes-energy-bills.html>

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