Research brings to light businesses' energy use

August 18 2014

A new Oxford University project called WICKED aims to help UK retailers cut their energy consumption and save money.

According to Oxford University researchers, many retailers, including those with smart meters, are not actively 'managing' how much energy they use and are paying larger energy bills than they need to. Under a new project called WICKED (Working with Infrastructure, Creation of Knowledge, and Energy strategy Development), funded by the Engineering and Physical Sciences Research Council (EPSRC), the Oxford research team led by Professor Peter Grindrod from the Mathematical Institute is seeking to work with retailers to help them find more efficient ways of managing their energy consumption.

Professor Grindrod said: 'We are looking for participants of all sizes, from small corner shops to big multinational retailers. We want to work with retailers, energy suppliers, business support groups, and energy advice companies to map the barriers to and opportunities for better energy management within the retail sector as a whole.'

The researchers define 'data-rich' organisations as those that have automatic meter-reading at 30-minute intervals, typically (but not exclusively) larger organisations with energy managers. They say these organisations can have problems too, however, often feeling swamped by the amounts of information they have to analyse. In small and medium companies, a recent Carbon Trust study found that there are approximately 2.7 million manually-read meters which are checked only quarterly or annually. This latter group is defined as 'data-poor' by Dr Kathryn Janda, based in Oxford University's Environmental Change Institute. She has co-authored a research paper (recently published in the *Journal of Property Investment and Finance*) that identifies some of the reasons for the gap between 'data-rich' and 'data-poor' organisations in the UK. She looked at a variety of non-domestic buildings, including arts venues, schools, a leisure centre, theatres and churches (with help from Pilio Ltd, an Oxford University spin-out concerned with energy analytics and innovative solutions to energy management problems).

Dr Janda highlights the Ambassador Theatre Group – with venues across the UK including London's West End – which cut its energy consumption by 15% in two years after employing a dedicated energy manager. The theatre group now has half-hourly electrical meters and regular reporting on energy use across all its sites. By contrast, the Church of England is highlighted as an illustration of the 'data-poor', with obvious barriers to energy efficiency given it is heavily reliant on volunteers rather than paid staff and has the task of heating and lighting historic buildings. The Church of England has committed to a carbon reduction target of 80% by 2050, but this goal may be difficult to

achieve without better energy information and management practices, says the study.

The *Journal of Property Investment and Finance* produced a special issue on improving energy performance in commercial property, co-edited by Susan Bright, Professor of Land Law at Oxford University. She concludes that over the past 40 years, the poor uptake of retrofit technologies and management practices has led to efficiency and performance 'gaps' between how buildings perform in practice and in theory.

Professor Bright said: 'Addressing the energy challenge in commercial property means we must understand not only the technical opportunities but also the social complexities. This includes the way in which property is owned and let. Half of the total UK stock of "core" commercial buildings is leased, and many properties are mixed-use, with both shared and private spaces. There needs to be a change in the way leases are drawn up, putting more responsibility on the owners to facilitate energy upgrades and environmental data sharing. Most leases currently do not include this sort of requirement for more energy-efficient practices.'

The WICKED research team will combine expertise in energy use, maths, computing, engineering, physics, law, and organisational behaviour for the EPSRC- funded research programme. It will use empirical research and big data analytics to uncover how much information is needed and by whom.

Dr Janda said: 'Although there are plans to replace and upgrade 53 million electricity and gas meters by 2020, until then there will be a gap between the "data-rich" who are using smart meters and the "data-poor" who are using manually read meters less regularly. Our project aims to help both groups through innovative metering technologies and big data analytics. Smart meters measure energy, however, WICKED's smart-er

meters also measure energy services. So for the first time retailers will be able to see the breakdown of energy usage, divided up into the things we actually care about, like light, heat, and building humidity.

'By using big data analytics, we will turn numbers into knowledge and provide retailers of all sizes with actionable insights to how they could use energy more wisely. This research is particularly timely as the Government's Energy Saving Opportunity Scheme is due to come into effect in 2015. The project promises real business potential in helping to cut energy bills and reduce energy consumption in the long-term.'

Provided by Oxford University