sustain' magazine v10 i05

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sustain' magazine volume 10 issue 05 2009

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McClelland Publishing

ISSN 1476-1572

The evolution of behavioural change

Buildings require the co-operation of their inhabitants to achieve true energy efficiency. NICOLA MARTIN reports on how technology is helping people to engage with their energy use.

Green building design continues to grow in popularity, to such an extent that it's now hard to believe that even a carefully-designed, low-energy building, which has been accredited according to BREEAM standards, can still use an excessive amount of energy. Why? People. They turn the lights on during a sunny afternoon; they turn up the thermostat instead of putting on a jumper. Architects can only reduce energy wastage so much at the design stage, and the facilities manager's role in energy conservation must be bolstered by the participation of the building's occupants.

While it's true that people can be the biggest enemies of energy reduction, with adequate persuasion, they can instead become energy efficiency's biggest proponents. As Fiona Roche, at Buro Happold Ltd argued in the *v10 i03* issue of **sustain'**, the behaviour of occupants in a building can have as much impact on energy consumption as the efficiency of the equipment. Getting people to change their behaviour has emerged as a crucial aspect of plans to lower energy use in buildings.

ACTIVE ENERGY USERS

Environmentalism has never been more popular, but there still remains a gap between how the population feels about climate change and their behaviour in using energy. Consumption of gas and electricity remains subconscious; they are seemingly limitless and invisible resources. This feeling is exacerbated in the workplace. While at home, people generally feel connected to the energy they use – they pay the bills, after all! – the reverse is true at work. The workplace can seem fixed, even stagnant, making staff feel disempowered to make energy-saving changes.

"The key is to engage staff with their working environment, making them into active energy users, not just passive inhabitants of the space," comments Anders Norén, Managing Director of building control systems provider, Priva Building Intelligence Ltd. "Studies have proven that in order to motivate people to change their behaviour, one must capture their attention. Technology, programmed to grab attention, is increasingly being used to help achieve behavioural change in organisations."

DIRECT FEEDBACK

In her 2006 report for Defra on behavioural change, Sarah Darby argues that "energy supply and consumption are sociotechnical in nature: technology and behaviour interact and co-evolve with each other over time". Building Management Systems (BMS) have already established a place in helping to achieve energy efficiency, through their programmable building controls. Now BMS technology is going a step further by "evolving" alongside occupants' behaviour.

Offering energy users "direct feedback" that clearly shows how much energy they use can produce energy savings of 5–15% (according to the Darby report for Defra). This kind of illustrative technology can be used as a lynchpin of wider energy-reduction campaigns. The usual awareness-raising measures like distributing leaflets and putting up posters in key areas can be tied back to software, as employees put into action the energy-saving measures that they learn about and see firsthand how they impact on the building's energy consumption.

Consequently, the building's interior environment no longer feels static – when people choose to make energy changes (turning specific electrical equipment off; turning the heating down and the like), they can see the landscape of the building's energy use change on screen. It becomes easier to identify branches or outlets that are using more energy than the average, and it is then possible to find the cause of the problem and correct it.

THE ENERGY-REDUCTION CHALLENGE

Universities and schools can provide a blueprint for how businesses and other organisations may respond to the energy-reduction challenge. At the Archbishop Ryan School in Dublin, for example, Priva Building Intelligence has installed a system that exports data via XML to a dedicated web application, which has made understanding energy information easy enough to appeal to even young children. Using its Top Control software WebDisplay enables all of the school's staff to access energy information in an easy-to-understand format from their computers.

Students are also able to access their own dedicated web application from a specially-mounted touchscreen that has been placed in the school's main circulation area. For staff and students wanting to learn about the school's construction, energy-conservation measures and monitor internal-air quality conditions, a cartoon character called Eddie Energy appears on the touchscreen, on hand to help.

CARBON COMPETITION

Priva and Keep Keen Controls Ltd (one of Priva's approved Priva Partner companies) have also worked with Lancaster University to help facilitate the university's 'Carbon Competition'. Students living in the university's 'townhouse'-style halls of residence (dubbed "Eco-residences") compete to achieve the lowest CO_2 equivalent footprint, with cash prizes of up to £600 awarded each term to the top three performers. In order that students can easily monitor their energy use, the Priva technology gathers metered data on energy and utilities usage in the houses. The data is then collated and made available to the university's facilities management team. This in itself is not unusual; however, what does set this project apart is that the data is then presented to the students via a password-protected area of the 'GreenLancaster' website. This allows students to monitor the impact of their energy consumption and to monitor it against their peers.

"The Carbon Competition has been a phenomenal success, showing that a real commitment has been made by Lancaster University to cut its carbon footprint," comments John Ward, Managing Director at Keep Keen Controls. "The results have surprised us; the students have really committed to the energy-reduction cause. It just goes to show that if you make energy use visible and easily-accessible, it motivates people to change their behaviour."

In fact, the Carbon Competition has been so successful that it has been made a permanent feature at the university. The Eco-residences have even won a Green Gown Award for their environmental performance, bestowed by the Environmental Association for Universities and Colleges (EAUC).

In the Carbon Competition style of incentive scheme, the amount spent on prizes is typically far below the amount of money saved through reduced costs. With sustainability campaigns *de rigueur* in organisations, visualisation technology provides an all-important transparency to workplace energy use. Not a mysterious, unseen force anymore, energy is something that end users can connect with, empowering them to make informed decisions about energy use