

e-Genie tool could grant energy saving wishes for businesses

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Credit: University of Nottingham

A new monitoring tool for businesses has been developed by researchers at the University of Nottingham to help reduce energy use and cut costs.

The e-Genie tool is an energy feedback system created by researchers at the University of Nottingham's school of Psychology and Horizon Digital Economy Institute with the purpose of engaging staff with energy data and supporting them to take action to reduce energy use.

The first field based trial of the tool was carried out at Nottinghamshire County Council offices and the results of this have recently been published in Building Research and Information which showed reductions in energy use of between 14 percent and 25 percent.

Digital insights



Dr. Alexa Spence led the study and says: "Non-domestic spaces account for around one fifth of UK carbon emissions, making energy efficiency and conservation in these built environments of paramount importance. Energy saving in the home is relatively well researched; however, an increased focus in recent years on non-domestic buildings means insights are also beginning to emerge around the digital technologies and behavior change interventions which can reduce energy use in the workplace.

We have seen with the roll out of smart meters in the home that the provision of energy information can have a significant impact on energy saving behaviour. Reducing energy use in non-domestic buildings is more of a challenge because so many people are involved and buildings have many different uses and energy needs. Responding to this challenge, efforts in recent decades have focused on removing energy and environment controls from occupants, and reconstituting them within increasingly sophisticated Building Management Systems controlled by Facilities Management. This top-down, technologyfocused approach has had mixed success, and the 'performance gap' seen in new buildings failing to meet their designed-for sustainability targets has become a well-recognised problem.

We designed e-Genie with the aim of tackling some of these issues, giving control back to the users by making energy data visible and supporting discussion between building users, taking the focus beyond individual behaviour to create and promote social energy behaviours."

User friendly

e-Genie was used in conjunction with thermal imaging camera phone attachments and thermometers. It features three energy data screens: a temperature calendar, an electricity monitor in KW which can label usage and an 'always on' tool that provides information on overnight



usage. Users could access e-Genie on their desktop computers, mobile phones or on tablet displays mounted at strategic public locations around the workplace.

Users had three options to engage in energy behaviour and take action on energy use. They could email their Facilities Manager to raise an energy concern or idea, discuss energy on the 'pinboard' website where thermal images taken could also be uploaded or use the 'pledge' feature to create a goal and associated plan to change their individual or social energy behaviour.

Energy-saving ideas

The pledge tool also provides ideas for energy-saving behaviour changes like 'turn off devices when I see they are not being used' and encourages users to make plans in order to meet these goals.

Phil Keynes, Team Manager at Nottinghamshire County Council was involved in the project and said: "e-Genie proved a really useful and visual way of positively engaging staff in facilities and energy management. It helped our staff to understand the complexities of maintaining comfort levels throughout the building and generated some great ideas for improvement."

Dr. Spence continues: "The study showed that if employees are made aware of their energy use and supported in taking action then social energy behaviour can be a fruitful way of identifying and making changes to the way energy is used in workplaces, with the potential for large savings to be made."

The e-Genie tool has been developed as open source software and is being made available for use through the Centre for Sustainable Energy (CSE), based in Bristol. CSE is also developing a toolkit for reducing



energy use in the workplace, partly based on findings from the Nottingham project.

Dr. Nick Banks of CSE said: "What is unique and interesting about e-Genie is the psychology and social theory that went into its development; it's not just about presenting information about temperature and cost to staff which has already been done in any number of energy management systems using dashboards. Its about how that information is presented, in what formats and the carefully designed tools that support it. For example it comes with a novel facility which allows individuals to pledge to take a particular action to contribute to the overall enegy-saving efforts of the workplace. There are also a set of predesigned workshop templates that allow staff to work through the data generated by egenie. I'm looking forward to installing e-Genie here at CSE – we are an office of 45-50 people – and building a service that introduces the technology to other offices and non-domestic spaces."

More information: Alexa Spence et al. Digital energy visualizations in the workplace: the e-Genie tool, *Building Research & Information* (2017). DOI: 10.1080/09613218.2018.1409569

Provided by University of Nottingham

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