

University of Cambridge Technical Innovation

'Of Engineers and Occupants' - Energy efficiency through innovative ventilation control

Section 1 About the project

Summary

The Hutchison/MRC Research Centre undertook a multi-faceted approach involving building occupants and engineering expertise, dramatically reducing environmental impact, enhancing the energy saving culture and reducing costs, crucially protecting the science budget. Installing an innovative *Demand Ventilation Control* system ('Aircuity') in May 2013 ultimately enabled these goals to be achieved with a payback of ~1.7 years.

Project partners

The research centre is a partnership working on translational cancer research between the University of Cambridge and Medical Research Council (MRC), who jointly funded this project. The research centre manager formed a partnership with the MRC engineer and Critical Airflow UK Ltd, to identify, design, install and operate the Aircuity system.

Section 2 The results

The problem

The ever increasing cost of utilities had become so significant that there was a real risk that infrastructure budgets could not cope and a **negative impact on the science budget** looked inevitable. Additionally there was growing corporate and social pressure on institutions to reduce their environmental impact.

The approach

Behavioural changes were made by engaging building occupants, enhancing the 'green culture' throughout the centre, without any significant impact on energy savings.

Then how the building itself was performing was looked at, resulting in modifications to the existing plant in consultation with the estates team engineers and specialist contractors.

Crucially, an innovative 'Aircuity' Demand Ventilation Control (DVC) system was installed, **the first of its kind in the UK**. Aircuity would significantly reduce ventilation rates to 'what is required' in laboratories rather than the original default 'design' of maximum airflows 24/7. The system would also monitor 'pollutants', adjusting ventilation rates to remove these from the laboratory environment.



UNIVERSITY OF
CAMBRIDGE

Profile

- HEI
- >18,000 students
- ~10,000 staff
- Urban - Cambridge



Working together

Finalist's case study

Our goals

By reducing the consumption of energy used by heating and ventilation in our 11 large laboratories, the goals of the project were threefold :-

- to reduce the expenditure on gas and electricity
- to reduce the environmental impact of the research centre
- to improve the laboratory environment for occupants
-

Obstacles and solutions

Obstacle	Solution
Funding - £94k capital project, must be funded equally by MRC and University partners	Eventually secured with corporate and local agreement by using savings from a previously awarded capital equipment allocation
Selling the engineers solution to the occupants	Research centre manager interacted effectively with staff at all levels in centre to gain directorial and general occupant 'buy in'.
Acceptance of change in environment	Promotion of expected changes, explanation of system, positive reasons for change and importantly the very positive outcomes.

Performance and results

Significantly reducing in baseline airflow in the laboratories, with air being provided 'on demand' as detected by sensors, had a very dramatic impact on utility consumption, with the following results :-

- Gas consumption for the centre fell by 41% and electricity by 9%
- £67k was saved in the first 12 months directly due to this reduction in utility consumption, protecting the science budget
- Payback on the project was only 1.7 years.
- Annual Carbon emissions were reduced by 400 tonnes CO₂e
- The laboratories were no longer draughty or noisy places to work, externally the building was quieter too, we had become a better neighbour
- The fact the Aircurity sensors monitored (and recorded) 'pollutants' such as CO₂, CO, TVOC and Particulates, the laboratories have become safer places to work
- The installation was very unobtrusive, a key factor being an occupied operational research centre

Section 3 The future

Lessons learned

- When budgets are tight and capital funding very limited, the importance of determination and creative thinking to secure funding cannot be overstated.
- Engaging with engineers to change the way a building performs was key to having the significant improvements that we required.
- Being bold enough to embrace a novel technology (the first installation in the UK) was also an important lesson to success.
- Communication of a project, how it works and importantly promotion of its successes is vital to gain support and enthusiasm for current/future environmental projects.

Sharing our project

There have been several presentations/webinars of the project, locally and nationally to key stakeholders in both the HE sector and industry, involving engineers, laboratory/facility managers and energy managers, including at the S-Labs conference 2014. Aircuity has now been installed in other UK institutions and ongoing/planned in others.

What has it meant to your institution to be a Green Gown Award finalist?

'The University of Cambridge winning a Green Gown award would not only be welcome recognition of excellence in the sector, but by rewarding and highlighting the positive steps Cambridge has taken, it would act as a catalyst, thus encouraging more activity and awareness around sustainability by staff and students in Cambridge.'

Professor Jeremy Sanders FRS Pro-Vice-Chancellor for Institutional Affairs, University of Cambridge

Further information

Project lead - Brian Richardson, Research Centre Manager, bar29@mrc-cu.cam.ac.uk

<http://www.environment.admin.cam.ac.uk/resource-bank/case-studies/energy-and-carbon-reduction/star-department-case-study-hutchisonmrc>

<http://www.mrc-cu.cam.ac.uk/environment.html>

<http://mrccancerunit.wordpress.com/2014/02/27/of-engineers-and-occupants-the-greening-of-the-hutch/>

<https://www.facebook.com/MRC.Cancer.Unit>