The Demands of a New Era

Any cursory inspection of UK building stock will reveal the scale of the challenge rushing headlong towards us. While the era of cheap oil that fuelled Wilson's "white heat of the technological revolution" is receding fast in the memory, monuments linger around every corner of Britain's streets. New solutions are desperately needed to meet the objectives of energy and carbon control.

Taking the lead at The Henley Business School

Fig 1. Henley Business School

Reducing energy cost and carbon emissions is a key ambition of the environmental strategy at Henley Business School where a rich and varied estate presents a significant challenge in this regard.

Via the CIBSE Intelligent Buildings Group, Henley sought to investigate the use of modern technology to better manage energy demand and initiated a pilot project in their student accommodation to draw practical and applicable conclusions.

The accommodation at Henley is well-insulated and has a communal wet-radiator system controlled by a "supply-driven" mechanism that has evolved over a number of years. The brief to Newera was to take two eight room blocks and living areas and measure, diagnose and control energy demand in one block and compare outcomes with the other equivalent block that was without control.

Fig 2. Student Accommodation at Henley

Manage Demand not the Heating System

For many reasons, the control of an energy management mechanism, say a boiler, has become entangled with the control of energy use. For more effective solutions, these two functions should be separated so that energy use is **demand**, not **supply** managed. An energy demand system can be fitted either stand-alone as a BMS or can work in tandem with existing supply management e.g. a legacy BMS – "pulling" energy based on real requirements rather than "pushing" energy according to a set of assumptions.

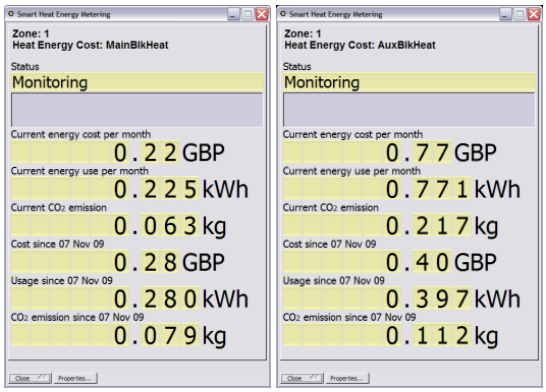
The energy demand system then becomes a key interface in an Information system, manipulating plant with instructive information via sensors and actuators and sending performance information to the corporate Information System.

> *"Better information leads to better buildings, with lower running costs and reduced environmental emissions."*
> ***From CIBSE TM39 Metering***

Newera at Henley

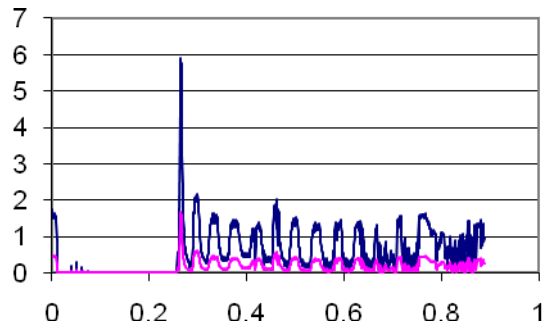
Newera installed a PIR, thermostat and actuated valve in each bedroom of the controlled block. These were connected to the Newera software on a local PC that was integrated into the IT network of the University of Reading to facilitate controlled and secure access by Henley personnel. Energy use was measured by a flow/return meter in the plant room and by a strapped electricity digital pulse output reader next to the switch box.

Newera Monitoring



The above two display windows show the energy usage and CO_2 emissions from the two blocks used in the pilot. The controlled block is named "MainBlkHeat" the block named "Auxblkheat" is not controlled. For the period of sampling from the 9th Nov 2009 to the 23rd Nov 2009, the energy consumed in the controlled block is 0.28 kWh in the uncontrolled block 0.397 kWh, a difference of 41%. The cost per KWh is an arbitrary figure at this stage.

Newera Diagnosis

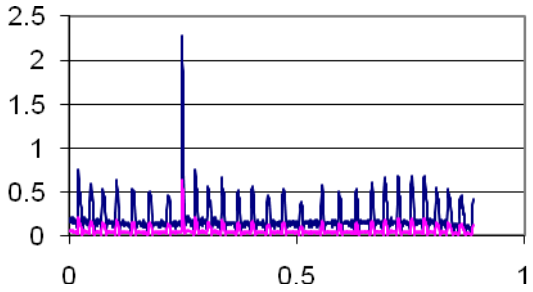


In the above graph of daily energy use and CO_2 emission from the uncontrolled block, Newera detected the inconsistent behaviour of the heating system – one block was on at night one block was not. This behaviour had remained unobserved for a significant period because the existing system could not deliver this data.

Accurate diagnosis is a vital stage in the provision of solutions for efficiency improvements. There is no point in fixing the wrong problem.

Newera Control

In comparison, the controlled block for that day uses far less energy (peaks at 0.5 not 1.0-2.0) with lower CO_2 emissions and cost. Closed-loop logic maintains a more stable temperature environment through the day. By the way, what's that spike at 6.00am? That's worth another look.



In Summary

Newera software can be installed stand-alone or in tandem with legacy energy delivery systems or BMS and deliver measurable tangible benefits through:-

(1) The analysis of existing system behaviour and performance

(2) The reduction of energy demand and hence energy cost and CO_2 emissions

Newera Software

- Closed-loop control logic in a PC package – no proprietary hardware required
- Monitors, diagnoses and controls energy demand
- Brings energy management systems into the IT mainstream

Next Steps

Henley has the option to extend control and monitoring to lighting and cooling using standard Newera functions. Using standard IT tools e.g. Microsoft Office, Newera can be integrated into the Henley booking system to further refine the control regime and deliver output information onto the University network as Excel spreadsheets for corporate accounting.

For more information visit www.newera-controls.com