

TREND CASE STUDY

Trend provides Cavendish Close Junior School with a best in class BEMS

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Cavendish Close Junior School is a large educational facility located in Chaddesden, a suburb of Derby. Having recently been rebuilt, a Building Energy Management System (BEMS) from Trend Control Systems is now used to maximise energy efficiency and create optimum comfort conditions for pupils and staff.

The original building was opened in 1933, with additional classrooms being built on in the 1970s. However, in May 2012, the school was informed that it was to be rebuilt as part of the Priority School Building Programme (PSBP), a government initiative designed to address the needs of the schools across the country most in need of urgent repair.

Construction work at Cavendish Close Junior School started on the site in March 2015, with staff and pupils moving into a new state-of-the-art building in time for the 2016 spring term.

As a PSBP approved service provider, Bowmer and Kirkland (B&K) was the main contractor on the project. As such it was committed to the safe management of the project, including making sure that major redevelopments in live environments caused

minimum disruption to learning or teaching time. It was also charged with configuring an innovative design solution that maximised the individual opportunities of each and every school site.

Energy efficiency was a key prerequisite of the new building. With education budgets being squeezed, introducing energy saving initiatives is not only good for the planet, it can also save a significant amount of money. Reducing energy consumption is one of the quickest and simplest ways to deliver direct savings and, according to The Carbon Trust, could help the average secondary school save £21,500 in energy bills – almost equal to the annual salary of a newly qualified teacher.

B&K called upon its subsidiary, Newark based Integrated BMS to configure a solution. The company's managing director, Jason Harper,

explains, 'We were established in 1994 and provide automatic controls and control panels for the building services industry. We pride ourselves on our ability to provide a very high quality solution throughout the duration of the project, and very often into the operating lifecycle of the working building with our planned preventive maintenance options. Just as importantly, we are proud to be recognised as a Trend Technology Centre, which means we have a high level of expertise in specifying, configuring and maintaining BEMS. As such we had no hesitation in recommending a Trend BEMS for use at Cavendish Close Junior School.'

The BEMS was configured to manage and control all the plant and building services and, in line with its corporate policy of always 'going the extra mile', Integrated BMS conducted significant research and development work with B&K, Trend and Nuair. Trend's advanced IQeco controllers were delivered to site, integrated within mechanical heat recovery units supplied by Nuair, who are a Trend Original Equipment Manufacturer (OEM). Heat recovery units deliver fresh tempered air into occupied areas whilst displacing stale air, to create a healthy and comfortable learning environment.





The units are seamlessly integrated into Trend's BEMS, with all the advantages that this offers in terms of optimising energy use.

Integrated BMS developed an operational strategy that would work within the specified project budget and allow each mechanical heat recovery unit to run as efficiently as possible. Jason Harper comments, 'Our work involved configuring dampers, as well as the requisite number of I/O modules for each classroom so that the IQeco device can communicate directly with a wall mounted control unit. This acts as a fan speed controller, a setpoint adjuster and a CO₂ monitor. If CO₂ goes above a certain level a button can be pressed that will then activate the mechanical heat recovery unit so that fresh air is introduced.'

Asked to explain why air quality is so important, Andrew Skelcey, Trend's Key Accounts Manager, replies, 'We've all experienced the effects of excessive CO₂ in a building – a stuffy environment makes it difficult to concentrate, and hard to remain alert and focused. For schools and other educational establishments this is an area of great concern and research has shown that students in a well ventilated classroom can concentrate better and achieve significantly improved results.'

The project also led to some innovative thinking when subsequently working with other schools in the Derbyshire batch. Initially, thermostatic radiator valves were going to be used, however, Integrated BMS suggested that the IQeco should be configured with an output so that a pressure independent control valve (PICV) could control the radiators via the BEMS, which has the additional advantage of being tamper proof.

However, Just as importantly, the system at Cavendish Close Junior School can be designed to sequence heat recovery and ventilation on just one system, rather than having two systems operating in conflict. This also provides night time cooling and optimum start/stop functionality.

Once the system was operational B&K needed to ensure that it met the criteria specified in the facilities output specification (FOS) document, which was generated by the EFA. As part of this, Integrated BMS had to find a way to allow the BEMS to output information to a pre-defined benchmarking system and generate information about operation of the building. This would allow the EFA to ascertain how efficient it is in relation to its initial design criteria, as well being able to compare it to other schools.

Describing the process, Jason Harper says, 'We were asked to integrate the BEMS with iSERV cmb, which has a database and analysis platform operated by the University of Cumbria. We worked together to configure a system that could collate information on a regular basis. This now involves sending an email to iSERV cmb, which imports data into its own SQL database and analyses it to devise a benchmarking system.

This has proven so successful that we now have seven other schools using the system.'

The BEMS has created a simple single control system that offers an energy efficient, holistic and easy to use solution for end users. It also eliminated complicated integration through the specification of a backward compatible system – something that will help reduce future lifecycle and energy costs. Looking ahead, it has given Integrated BMS insight into areas that could be further refined in the future. This includes automated window control and redesigning the Trend 963 Supervisor graphical user interface (GUI) to make it as simple as possible to use by introducing big buttons on the screen, and developing a separate teacher and maintenance staff log-in system.

For Richard Daniels, Environmental Engineer at the EFA, the work at Cavendish Close Junior School is ground breaking, 'This is the first school we know that where the contractor has been able to use the energy monitoring system specified in the PSBP output specification to validate the commissioning of meters and controls and to get a good picture of the energy end uses in the building as part of Post Occupancy Evaluation.'

Ultimately, this all adds up to higher levels of energy efficiency and a better learning environment for pupils. The work carried out by Integrated BMS and Trend can be taken forward to other schools that are part of the PSBP.

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