



ESFA Schools Collaboration UK

IES, Bowmer + Kirkland and Integrated BMS have been working together to improve operational performance, monitoring and verification of ESFA schools, using iSCAN and IESVE to define a new process which could be key to closing the performance gap.



ESFA SCHOOLS COLLABORATION UK

SECTOR: ICL/Consulting

DATE: February 2020

COUNTRY: UK

www.iesve.com



The collaboration between IES, Bowmer + Kirkland (B+K) and Integrated BMS (iBMS) began in 2016. The aim was to facilitate more effective benchmarking, monitoring and performance verification of schools delivered by B+K, as an approved contractor under the Education and Skills Funding Agency's (ESFA) School Building Framework. Supported by IES technology, the three parties are now close to defining a process which could finally put an end to the performance gap.

B+K need to ensure that, once operational, their schools are performing as efficiently as possible. This is driven by ESFA guidelines, which require each contractor to monitor and report on the energy and water use of each school using currently specified modelling tools.

However, B+K ultimately realised the data they were seeing through existing methods was only providing a small proportion of what they needed to accurately validate performance of the schools. After consulting with IES, they recognised that reporting monthly meter consumption was not enough and more granular insights were required to fully understand the schools' various sensor and sub-meter data logs and how these could translate into actionable intelligence to improve building performance.

Using iSCAN - which enables the centralisation and analysis of any time-series data from different sources in one platform, while using a combination of physics-based simulation, artificial intelligence and machine learning to synthesize and fill missing data gaps - IES performed initial diagnostics on some B+K schools. This brought to light previously undetected performance issues, such as manufacturing and commissioning issues with heat recovery units, resulting in overheating, as well as abnormal use patterns, such as radiators being left on while the windows were open.

The team began working with controls contractor, iBMS, to refine the process of collecting and transmitting data from the schools. Achieving reliable connectivity for this data exchange initially proved challenging. However, the project partners tested a series of protocols, starting by collating the data in a BMS controller for each data point at 15-minute intervals, exporting to a CSV file and importing this into iSCAN daily for analysis. Next, they progressed to an Open Building Information Exchange (OBIX) protocol to automate this process, and ultimately transitioned to an MQTT protocol to allow direct data upload of lighter-weight file sizes. This significantly reduced the bandwidth and traffic on mobile network routers, whilst providing granular (1-min) operational insights on the schools in near real-time.

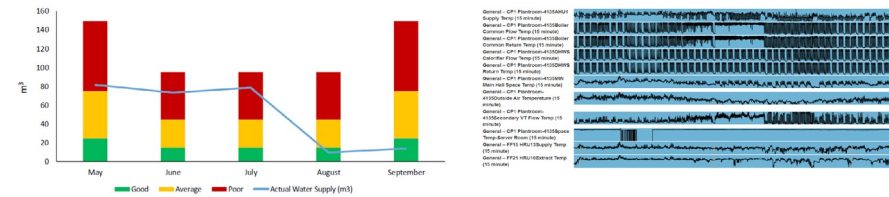
Next, the team considered how they might use that data to create energy profiles for the schools which could be fed back into the IES Virtual Environment (IESVE) building simulation software. The ultimate aim was to create calibrated simulation models to facilitate benchmarking and help close the gap between the actual schools in operation versus their design intent, as well as enabling active monitoring to help each school reduce its energy consumption and understand when their buildings are operating out of tolerance.

Many projects already use IESVE to model the building during the design phase which means much of the information on how the buildings should be operating is readily available in an existing model. This collaboration, and the integration of iSCAN, allowed the team to close the loop by bringing the real world data back into the existing model environment for cross comparison and validation that the buildings are operating as intended.

The collaboration is unique as this is the first time a Main Contractor, Building Performance Analysis Consultant and BMS Controls Sub-Contractor have come together to tackle the performance gap as part of a truly integrative process. It has helped B+K ensure they are technically delivering the right solutions for their clients, improving the way they work with their supply chain and evolving end client interactions to help educate and provide guidance on their energy use through accessible energy dashboards.

iBMS have also gained valuable insight on what happens to the buildings after they are handed over and how they can learn from this to improve future installations, while IES have been able to further explore the performance gap and how their technology can prevent modelling process inefficiencies and errors.

The project team won the Collaboration Award at the 2020 CIBSE Building Performance Awards, with the judges commenting on their ability to come together to identify and resolve real challenges in an important sector and that the potential for other applications was very strong.



"The impact of this project could be massive. To benchmark similar types of buildings and operate them efficiently you need to understand so much and understand it at the right time. You need granularity of data, the right processes and tools. We think we've come up with a way of standardising that process of getting the data [via iSCAN], putting it into a software tool [IESVE] and outputting the energy profiles. If everyone had a guide where they could use a piece of software like this and have a defined process to follow, we could remove the performance gap entirely."

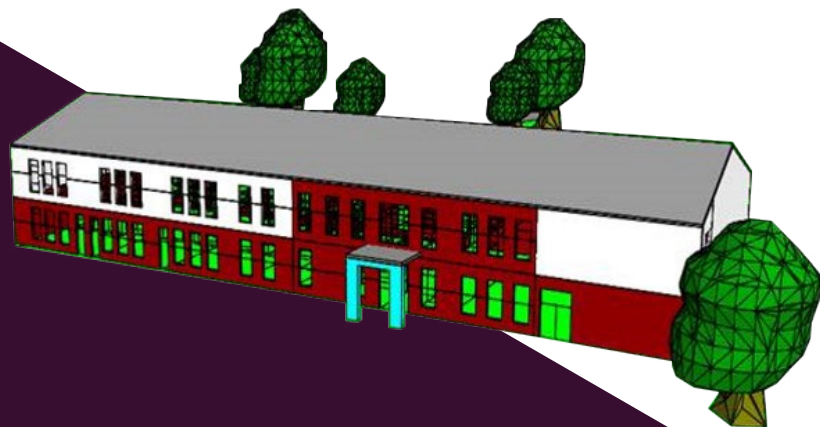
James Vaux-Anderson
Framework Delivery Director,
Bowmer + Kirkland

"Big data analytics is becoming more at the forefront of the industry on the controls and building management systems side. To be able to feed that analytics engine you need data and you need to be able to prove the data you're sending into it is good and reliable. It's not good enough to say we've installed this system, it should be fine and we'll see how it's going in 5 years. It's something that needs to be constantly analysed and checked so that it is performing to the best of its ability. That's where, I believe, iSCAN and the processes we are using will really come into their own."

Jason Harper
Managing Director,
Integrated BMS

KEY FACTS

- Winning Collaboration at the CIBSE Building Performance Awards 2020
- Potential solution to eliminate the performance gap
- Unique data capture & analytics using iSCAN and model calibration using IESVE
- First of its kind collaboration between a Main Contractor, Building Performance Analysis Consultant and BMS Controls Subcontractor





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