

Case Study | St Katherine's School

St Katherine's School is part of the Cathedral Schools Trust, a well-established and creative multi-academy consisting of 12 primary and secondary in the wider Bristol area.



SSE Energy Solutions (SSE) were introduced to St Katherine's by Utility Aid, an energy consultancy specialising in assisting charities and not-for-profit organisations with managing and reducing energy costs. Our long term partnership already included the procurement of 100% renewable energy from SSE's wind farms, delivering clean, reliable energy.



Smart Buildings, whose primary expertise is in designing and

delivering building decarbonisation projects, met with Cathedral Schools Trust to discuss an innovative proof of concept. Aiming to optimise and control the school building environments, thereby enhancing the learning experiences and well-being of both students and staff while supporting their decarbonisation efforts.

Challenges

St Katherine's School currently has an aging Building Management System, and were keen to have a simplistic and cost effective solution without costly system overhauls. Our solution allowed them to have better control of their educational environments due to their existing temperature controls being through manual Thermostatic Radiator Valves (TRVs) which could be easily adjusted remotely at any given time, via cloud connectivity.

Approach and Methodology

After understanding Trusts requirements and outlining our solution, we systematically delivered a four step process to create baseline of energy performance.

This crucial step quantifies the current energy consumption within the Trust's buildings, highlighting opportunities for improvement in each school and select the buildings with the greatest return on investment potential to conduct the initial proof of concept.

Our Optimal 'Benchmark' Assessments for the Trust's 12 schools, comprising 21 buildings utilised publicly available information validated by the Trust to estimate energy usage (both thermal and electrical) based on the type and size of each building.

St Katherine's School was selected due to its large estate with five different types of buildings that have uncontrolled wet heating, lack occupancy control, and this choice was supported by the Trust's Facilities Manager. The potential thermal savings identified for this school are conservatively estimated at £3,000 per annum.

Solution

Our solution includes the installation of a Connect Box and 94 TRV controllers, along with five occupancy sensors strategically placed. The cloud based solution we specified utilises open IoT solution designed to connect and monitor energy consumption and building status, making it ideal for small and medium-sized buildings like St Katherine's School estate. Its key capabilities are as follows:

- **Versatile Connectivity** - Connects to a wide range of building equipment, including sensors, meters, heating, cooling, and air handling systems, as well as building automation and control systems (BEMS) based on a manufacturer-agnostic device and equipment catalogue.



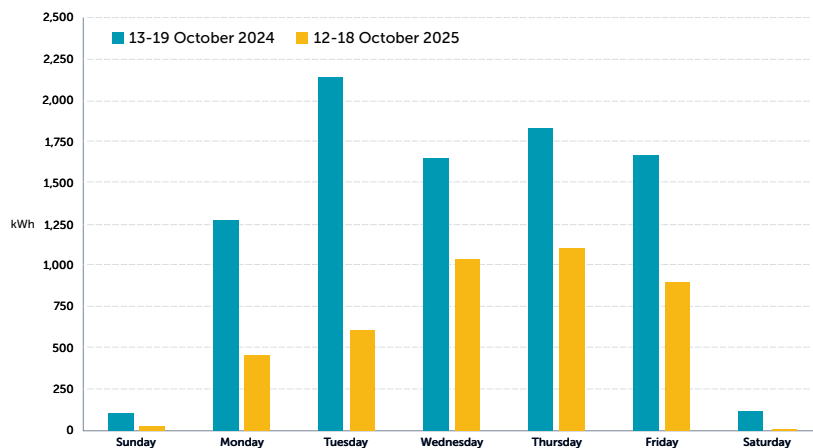


Figure 1: Gas usage (kWh) in one week in October 2024 (before installation) and 2025 (after installation)

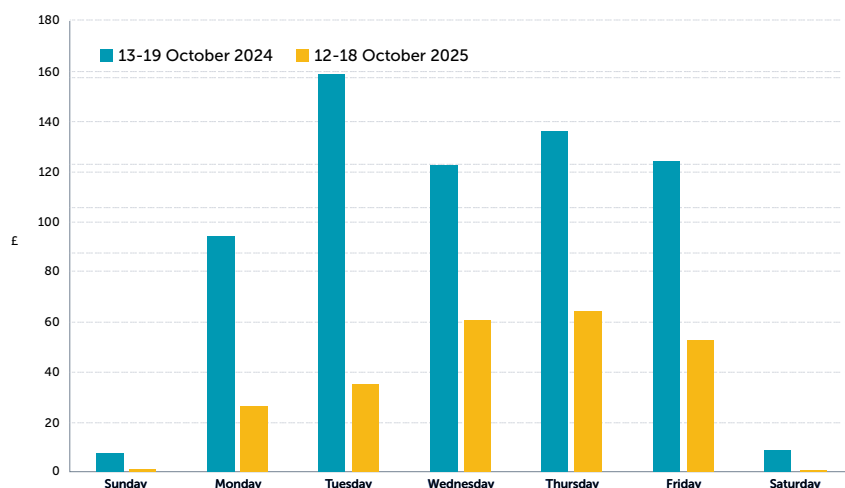


Figure 2: Gas usage (£) in one week in October 2024 (before installation) and 2025 (after installation)

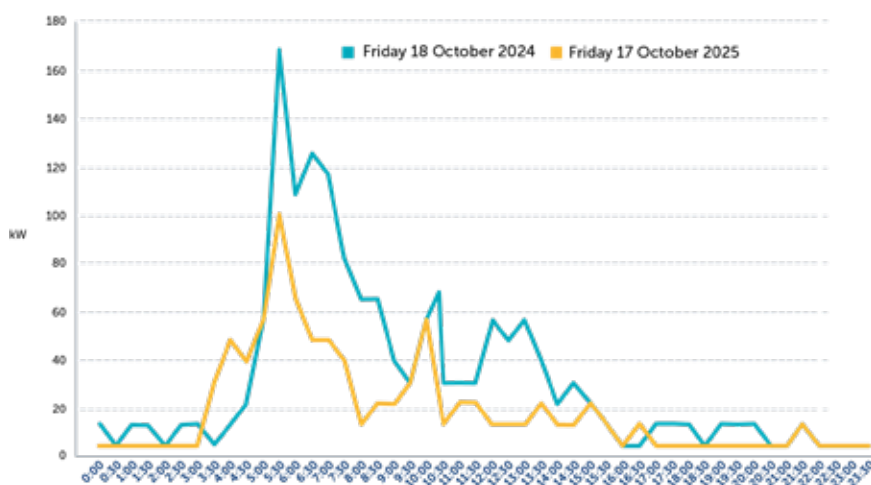


Figure 3: Gas usage (kW) over 24 hours in October 2024 (before installation) and 2025 (after installation)

- Quick Installation - Interfaces seamlessly with existing BACS and third-party devices, automatically creating a new BAC system if none is available. The system is fully configurable remotely via a dedicated user web interface.

- Plug and Play Web Connection - Automatically connects to the Internet and receives over-the-air updates via GSM/4G (or optionally via Ethernet). It comes with an ever-growing library of over 500 field devices that have been confirmed for compatibility and are ready to connect.

- Flexible Monitoring and Control - Enables remote monitoring, control, and logging of data, whether on-premises or in the cloud.

- Visualisation tools with alarm functionality available through the web interface on both desktop and smartphone, allowing users to monitor and manage their buildings from anywhere.

Having engaged with the school, it was clear they are on a broader decarbonisation journey, having already installed LED lighting to reduce their base energy demand, however previous attempts to make Solar PV systems stack up, coupled with the aging buildings was not possible. Through our partners we were able to redesign a system which outperformed previous kWp outputs at a lower cost, seeing a return on investment in under 5 years.

Projected Reductions and Savings



Energy savings
41,490 kWh per annum



Emissions Reduction
7.57 tCO₂e per annum



Cost Savings
£3,000 per annum



Better Wellbeing
Monitoring

Results and Benefits

The initial results our connected solution has driven have been significant. Some of the key outcomes are the finite control cloud connectivity delivers, optimum comfort and learning spaces which minimises solar gain issues. The key outcome here however is the strategic energy consultancy partnership that has been formed where together SSE, Utility aid and the Trust are working together to drive a decarbonisation plan which can be replicated across many other schools.

- **Centralised Building Plant** – In instances where buildings share a single heating plant but have differing temperature requirements—such as teachers needing a temperature of 21°C and students requiring 17°C—the new TRV controls make it possible to meet these varying needs.
- **Ease of Installation** – The installation process was easy and non-intrusive. The system is fully wireless and can be remotely configured via cloud setup.
- **Driving Innovation** – St Katherine's School believes that this innovative approach to environmental control will help attract more after-school clubs. The Connect Box solution acts as a gateway to visualise and manage their assets, with the ability to easily add more wireless devices to drive incremental savings and benefits.

Testimonial

"The Thermostatic Radiator Valves installed by SSE Energy Solutions have made a significant impact on our sustainability goals at St Katherine's. In just one week of heating, we saw a 62.8% reduction in gas usage compared to the same week the previous year. This translated into a 52.65% decrease in our gas bill – a remarkable financial and environmental win.

This improvement is entirely due to the ability to set target temperatures in individual rooms, giving us precise control over our heating. I'm confident we'll see even greater savings once we implement scheduled heating, allowing radiators to switch on and off automatically.

Encouraged by the results, we've expanded the system into our Maths and Science block and are now integrating smart lighting controls using the Siemens Connect Box. With occupancy sensors and current monitoring in place, we're building a clear picture of energy usage and expect further efficiencies.

None of this would have been possible without the support of SSE. Their commitment to helping us better manage our energy has sparked a wider initiative to install smart controls across the site. The savings we're achieving will be reinvested into key infrastructure projects, ultimately enhancing the learning and working environment for our students and staff."

Alex Poulton, Facilities Manager

For a better world of energy

To find out more about how SSE Energy Solutions can help your organisation, get in touch today
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