Case Study

AIR-SOURCE HP

EQUIPMENT

38 AquaCIAT TD300 air-source Caleo heat pumps

CIAT High Temperature Heat Pumps Chosen for Pioneering School Decarbonisation Project

CIAT heat pumps are being used in a ground-breaking project by a multi-academy school trust to decarbonise heating across several schools. The project is anticipated to reduce carbon emissions by more than 9,000 tonnes over the lifetime of the scheme, and save around £84,000 a year in energy costs.

Abbey Multi-Academy Trust (Abbey MAT), based in Yorkshire, is employing 38 AquaCIAT TD300 air-source heat pumps in five schools, with the £5m project being funded under the Public Sector Decarbonisation Scheme (PSDS).

The scheme uses renewable electricity generated by solar photovoltaic (PV) arrays installed on school buildings, which partly power the CIAT heat pumps and help further reduce operating costs and carbon emissions. During the summer, when the school is closed and energy use significantly lower, electricity produced by the PV arrays will be fed into the grid, producing an income for the Trust and helping to cover energy costs for the rest of the year.

Heat Pump clusters

David Ryder, Head of IT and Infrastructure at Abbey MAT, said: "At our large secondary schools, the CIAT heat pumps are deployed in clusters in the form of 'farms'. The units harvest low grade 'free' energy from the environment and upgrade it to a useful temperature, replacing the need for high carbon-emitting gas boilers in the majority of school buildings."

The key to success is optimising system performance by adjusting flow rates and set points to ensure comfortable indoor temperatures for students and staff throughout the day and over the year, as seasons change.

He added: "We are collaborating with our project partners, consultant Energy Management Group Ltd (EMG), Robert Whetham Associates, HVAC specialist BReng Hull, and equipment supplier Cool Designs, in an ongoing process to develop the best possible outcome for our schools and the environment."

Due to an impending funding deadline, Abbey MAT's grant application for the scheme to Salix Finance (which administers the PSDS on behalf of the UK government) required submission of detailed proposals for each school ▸

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Abbey MAT Project - ASHPs

within a tight window of just two weeks. The Trust worked closely with decarbonisation specialist EMG to prepare the application.

Working against the clock, one of the key challenges was to assess the requirements for upgrading existing radiators, to take account of the lower water temperatures delivered by the heat pumps. Detailed room-by-room surveys were carried out by Rob Smelt, director of BReng Hull, in collaboration with EMG and Toshiba Carrier distributor Cool Designs Limited on the technical aspects of the grant submission.

The audit took account of the type and size of existing heat emitters, glazing, building fabric, room orientation, insulation and occupancy levels. It resulted in around 50per cent of existing radiators being replaced with higher capacity units, or augmented with new units to achieve the required heating capacity. The additional investment required was covered by the successful PSDS grant.

Fine-tuning of the systems at schools converted to date has already begun, with an initial water temperature of 65deg C in the early morning reduced to 50deg C once students are on site and in class, taking account of the circa 3KW of heat they contribute within the average classroom.

Temperature data

The Trust is developing an innovative school-wide heat map, produced using temperature data from new heat-sensitive fire alarm systems. "The idea is to give a real-time overview of actual conditions in each space across a school, so that set-points and flow-rates from the heat pumps can be further optimised," said David Ryder.

Paul Smith, Sales Director for Applied Products, Toshiba Carrier UK, said: "We congratulate David Ryder and Abbey MAT on their vision and innovative approach in making the switch to renewable energy for their schools' heating needs.

"In adopting high performance CIAT heat pumps – with the added benefit of solar-generated electricity to power them – the schools have undertaken a major transformation that sets them firmly on the path to becoming carbon neutral. It is a journey that all public and commercial buildings will need to make if the UK is to achieve the nation's strategic goal of being carbon neutral by 2050."

Innovative projects such as this Abbey MAT scheme contribute to Carrier's target of reducing customers' carbon footprint by more than one gigaton, while also achieving carbon neutral operations by 2030, as outlined in the company's Environmental, Social & Governance (ESG) Goals.

For more details on CIAT heat pumps, visit:

https://ciat.uk.com/product/aquaciat-caleo-ht-hw/

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