

## Phased Decarbonisation Project

# KEPIER SCHOOL'S JOURNEY TO NET ZERO WITH CIAT UK HEATING TECHNOLOGIES



## HIGHLIGHTS

A room-by-room audit identified the requirements for a new system of high-efficiency heat emitters based on modern CIAT fan coil units (FCUs).

The project included removal of conventional radiators and replacement with seven CIAT MajorLine FCUs and 31 CIAT COADIS units.

## OUTCOME

Initial decarbonisation stage delivered sizeable energy savings of 70kw a day during the heating season, equating to an annual gas energy saving of 9,800kWhr and reduced carbon emissions of 1,800kg CO2.

Later analysis showed an 8.6% reduction of 2,824m3 (~31,446.41 kWhr) from March 2022 to March 2023 compared to the period from March 2019 to March 2020.

Carbon output greatly reduced and resulted in an 8% annual cost saving of ~£800 (avg. based on gas price fluctuations between March 2019-2020 and March 2022-2023).

## Overview

In 2022, Kepier School in Northeast England embarked on a major transition towards sustainability and energy efficiency with the help of CIAT UK and its partners.

This initiative aimed to reduce the school's carbon footprint and energy consumption through the phased transition to low-carbon heating solutions.

Within a year of implementing these changes, the school reported substantial energy savings, highlighting the project's success and setting a precedent for similar institutions aiming for net zero emissions.

## Background

Recognising the urgent need to begin their transition to net zero emissions, Kepier School engaged CIAT UK, BREng Hull Ltd, AA Projects, Quora Group, and Cool Designs Ltd to design a comprehensive solution.

Supported financially by the Condition Improvement Fund (CIF), the team of partners designed a viable, cost-effective approach to future-proof Kepier School's heating infrastructure.

## Challenge



Schools face challenges in reducing their carbon emissions, primarily due to outdated heating systems historically reliant on gas boilers. Kepier School installed seven new gas boilers in 2019, a significant capital investment they could not afford to replace all at once.

Issues with the existing heating system resulted in wasted energy and poor comfort conditions. Some classrooms overheated year-round due to inadequate control of fan convectors. Hot water continued to circulate even though the set temperature had been achieved and the fan switched off.

In addition, work needed to be undertaken during term time without disrupting the day-to-day operation of the school.

These considerations had to be factored into the design and planning stages.

## Solution

A detailed heating audit revealed the need for new, high-efficiency heat emitters. Conventional radiators were replaced with seven surface-mounted high-level CIAT MajorLine fan coil units (FCUs) and 31 CIAT COADIS.

This allowed the equipment to be installed while the school continued to operate with the existing heating system. The system comprised seven gas boilers installed in 2019, which were integrated into the new system to allow for their gradual replacement as they reached end-of-life. This enabled the school to capitalise on its original investment, with each future boiler replacement enhancing the system's efficiency and generating more significant cost savings.

The new units were selected based on the outputs achievable with lower water temperatures. This allows the school to undertake decarbonisation in two stages.

The new boilers operate in full condensing mode at lower temperatures, saving energy, reducing running costs and reducing carbon emissions. When the boilers are eventually replaced with high-efficiency air-source CIAT heat pumps, the correctly sized heat emitters are already in place to enable a seamless transition, delivering immediate savings and spreading investment costs.

The new heat emitters' flow temperature was dropped from 80deg C to 50deg C, yielding a 30deg C reduction in the heating uplift required to boost efficiency and reduce electricity costs.

The new system also uses dedicated classroom-based controls and inverter-controlled water pumps to reduce energy use further and improve year-round comfort conditions.

"The process doesn't stop once a solution has been designed, installed and commissioned. Experience shows that there are often significant additional gains to be made by optimising the system in light of its real-world operation."

Rob Smelt, Managing Director of BEng Hull Ltd.

## Results

Following commission, the initial decarbonisation stage delivered sizeable energy savings of 70kw a day during the heating season, equating to an annual gas energy saving of 9,800kWhr and reduced carbon emissions of 1,800kg CO2.

A later comparison of gas usage before and after the pandemic (to account for potential data skew due to COVID-19 school closures) showed an 8.6% reduction of 2,824m3 (~31,446.41 kWhr) from March 2022 to March 2023 compared to the period from March 2019 to March 2020.

This achievement reduced the school's carbon footprint and resulted in an 8% annual cost saving of ~£800 (average based on gas price fluctuations between March 2019-2020 and March 2022-2023).

CIAT UK and its project partners later conducted a performance and optimisation review of the system, identifying opportunities for further energy and cost-saving improvements. The inspection revealed that some areas were imbalanced while others operated at sub-optimal temperatures. These issues were addressed to improve occupant comfort and reduce energy use and running costs.

"The key is to upgrade heat emitting systems, so the move to low-carbon heat pumps can be made seamlessly when the time comes to replace end-of-life gas boilers."

"The CIAT units are reliable and highly efficient. In terms of controllability and cost per kilowatt output, no other manufacturer can compete with them."

Rob Smelt, Managing Director, BEng Hull





One of 7 above door-mounted CIAT MajorLine Fan Coil Units (FCUs).

## Conclusion

Kepier School's phased transition to low-carbon heating technologies, facilitated by CIAT UK and its partners, exemplifies a successful approach towards achieving net zero emissions in educational institutions.

The project realised immediate energy and cost savings, despite the system's mid-transition phase reliance on seven gas boilers.

It has laid the groundwork for future sustainability, underscoring the importance of continuous system optimisation and the potential for similar initiatives to contribute to environmental goals.

## Core Product Features



### COADIS LINE 900™

COADIS LINE is the perfect mix for energy efficiency, thermal and acoustic comfort, IAQ, and aesthetics.

#### BENEFITS

**ENERGY EFFICIENT:** Energy efficient: HEE low consumption motor with variable speed technology.

**THERMAL COMFORT:** Thermal comfort: Highly reactive and high-quality level of diffusion.

**ACOUSTIC COMFORT:** Acoustic comfort: Very quiet operation due to HEE motor and frames acoustic insulation. IAQ options.

**ECO-SUSTAINABILITY:** Eco-sustainability: Innovative rivet- and glue-free chassis dismantling for total component recycling.



### CIAT MAJOR LINE™

MAJOR LINE offers various mounting possibilities and a range of accessories, allowing it to be adapted to any installation or application.

#### BENEFITS

**ENERGY EFFICIENT:** HEE low consumption motor.

**THERMAL COMFORT:** Very high temp uniformity in comfort zone.

**DIFFUSION:** Coanda effect via the fixed fins oriented to rear.

**ACOUSTIC COMFORT:** Very quiet operation: NR > 20 at low speed.

**EASY TO INSTALL AND MAINTAIN:** Complete unit, ready to install. Integrated supply and return.

**EASY FILTER & FAN ACCESS:** Fan mounted on a pivoting slide with two access points. Removable filter casing with 2¼ turn screws. Removable bi-block volute for access to the entire GMV.

**ECO-SUSTAINABILITY:** MAJOR LINE ABS parts are fully recyclable; the product is 85-95% recyclable (size dependent). Easy dismantling and part traceability. Mounted on a pivoting slide with two access points.

