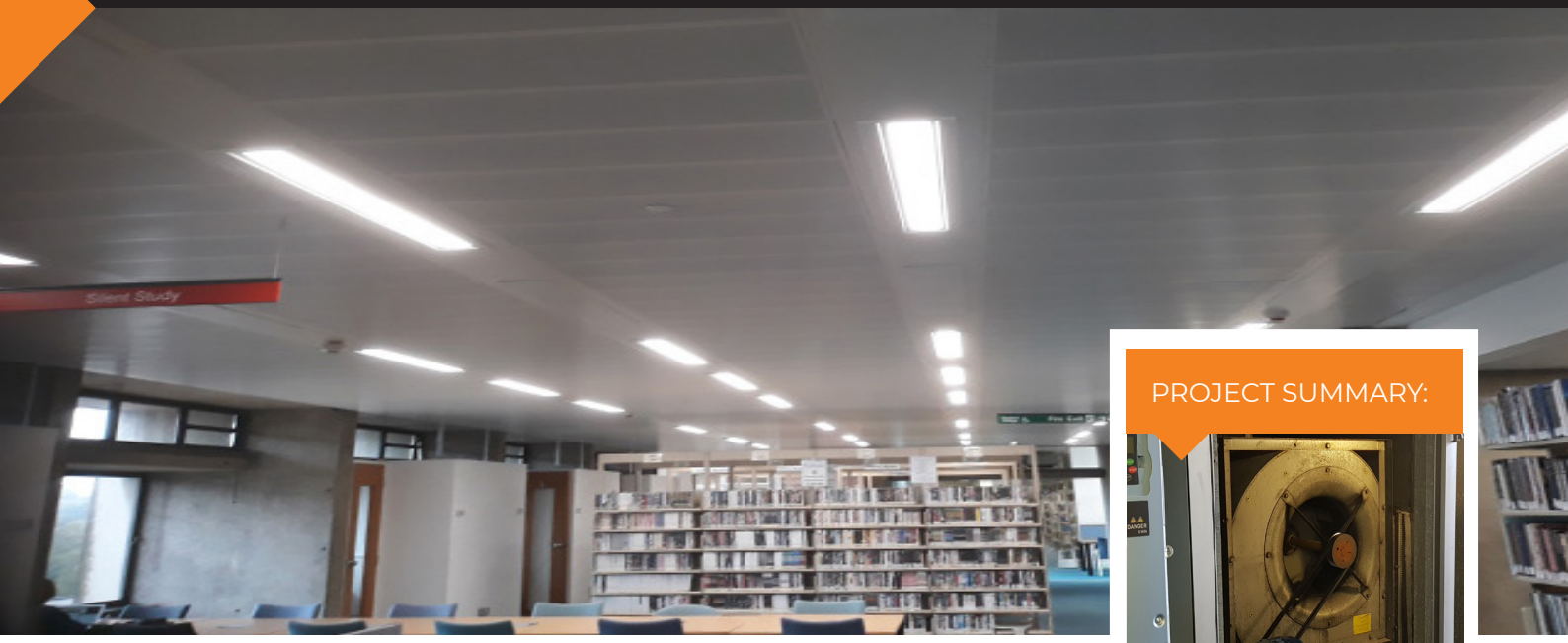
VITAL ENERGi

CASE STUDY

University of East Anglia

ENERGY CONSERVATION MEASURES



OVERVIEW

The University of East Anglia (UEA) have made a commitment to reduce their energy usage by 25% by 2020 compared to the 2013/14 baseline when their gas and electricity spend was approximately £4 million per annum. As part of this plan The University have made a £1 million investment in energy conservation measures (ECMs), which will see the implementation of a range of technologies to save energy and reduce carbon emissions.

CHALLENGE

We analysed the University's energy usage and performed a survey of areas which could yield savings such as improved building controls, air handling and lighting. In phase 1 this was restricted to the buildings which had the largest energy usage. These included 6 academic buildings and 22 halls of residence blocks.

During the design period we installed vCOMS (Vital Controls Optimisations and Management Service) to collect and analyse energy and operational data from the sites Building Management System (BMS). Using the information obtained alongside surveys of the existing infrastructure it was possible to develop a number of reliable and robust profit generating upgrades which would save significant energy usage and, therefore, lower carbon emissions.

The following recommendations were put forward in an Investment Grade Proposal to the University, which explains key themes such as investment costs, payback times, energy savings, carbon reductions and Measurement & Verification methodologies

- Upgrading chiller condenser fans
- Upgrading Air Handing Unit fans
- LED lighting upgrades
- Implementing controls optimisation

Updating Air Handling Unit & Chiller Condenser Fans to Generate Savings

We identified buildings where we could deliver significant savings through the energy efficient refurbishment of 20 packaged air handling units and replacement of 44 condenser fans on three of the chillers serving the main cooling network.

Whilst the infrastructure may have been state of the art when originally installed by

PROJECT SUMMARY:

CLIENT
University of East Anglia

PROJECT
Energy Conservation Measures

TIMESCALE:
July 2018 – October 2018

CONTRACT VALUE:
£1m

THE BENEFITS:

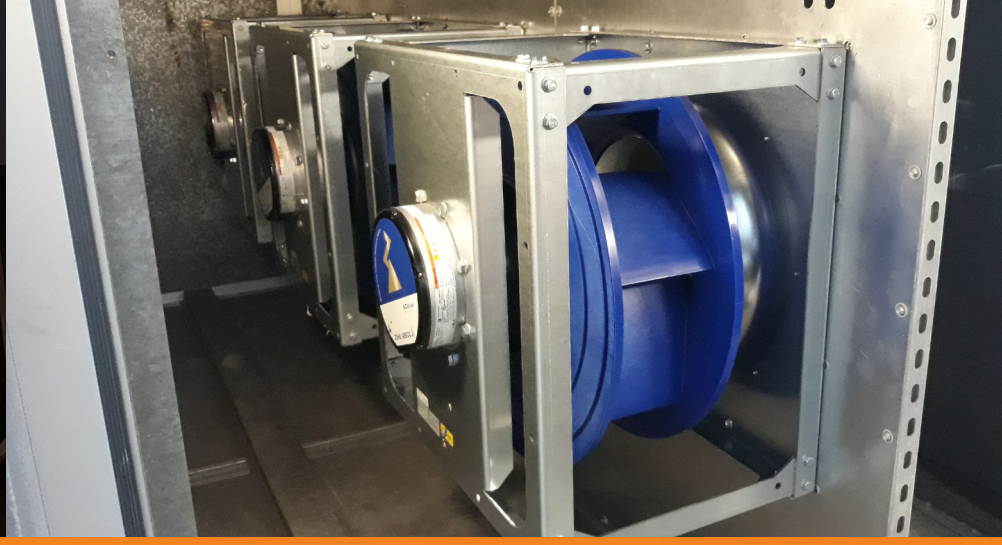
> Carbon reduction of 543 tonnes per year

> Financial savings of £184,000 per annum

> Increased lifetime of HVAC equipment

> 300kW reduction to daily electrical peak which allowed an extra building to be constructed, without having to upgrade the campus electrical supply.

Works to the chiller and air handling system will result in financial savings in excess of £60,000



‘Overall, the energy conservation measures will save a guaranteed £184,000 per year, achieving project payback in under 6 years. The biggest driver for the University, however, was to lower CO2 emissions; the first phase of works will reduce carbon emissions by 543 tonnes per year.’

THE SOLUTION

the University, technology has advanced and more modern solutions can offer significant performance improvements. We were therefore able to specify modern, more efficient fans, which combined improved efficiency with increased reliability. These were connected to the existing BMS controls and balanced to achieve the correct flow rates.

It was also determined that the University’s cooling infrastructure could yield large savings by upgrading the condenser fans on packaged chillers to more modern technology and we identified 3 units which could be upgraded. These savings are generated from both the newer fan motor designs and fan blade technology which has improved significantly since the original units were installed. Works have a payback period of under 5 years.

Delivering an upgraded smart lighting network throughout the library

We have a strong track record surveying lighting systems and implementing upgrades and this extensive experience was put to use when assessing the University’s premises. We identified that the library uses a large amount of energy on lighting as it operates 24 hours per day, seven days a week and is open during both term and non-term time all year round.

Our designers identified that upgrading the inefficient lighting system, with more efficient LED alternatives could generate large carbon savings and energy cost reductions. Our approach was to maximise savings based on a full re-design of lighting within the library to maximise energy savings whilst achieving compliance with industry standards. Overall, we installed 1,834 fittings, including emergency lighting such as exit signs and gateways and these replaced 2,759 older fittings. In appropriate areas, smart fittings were installed to control light levels based on the availability of natural daylight.

The upgrades to the lighting system deliver annual electricity savings of 587,000 kWh, which equates to 147 tonnes of CO2 and financial savings of over £72,000 per annum and will result in a payback period of just 7.6 years.

Implementing the vCOMS System to Control and Monitor the Works

Our vCOMS (Vital Controls Optimisation & Management System) system was installed onto the Trend BMS and used to identify opportunities for improvement and, after implementation, to monitor the scheme and ensure optimum performance.

An example of the value vCOMS can bring to a scheme can be seen in one of the opportunities identified. It was noted that high internal temperatures inside and outside of occupancy were affecting comfort levels and increasing cooling demands in critical labs in the Chemistry, Biology and Sciences buildings. We introduced a heating economy control to account for internal and external temperatures and adjust the system to maintain a 20°C comfort set point and night setback, which reduced the temperature in the labs outside of occupancy hours. Despite higher ambient conditions post-delivery, the average space temperatures were reduced by almost 2°C across Chemistry North. In short, vCOMS identified an opportunity to improve comfort conditions while reducing energy consumption.

Once the energy conservation measures had been identified and installed vCOMS continues to ensure that the main energy consuming plant only operates at the times and temperatures which match the occupancy requirement. The system can do this by monitoring the performance of the building to ensure it operates within the expected parameters to maintain comfort levels for the building users. If the system performs outside of the expected parameters, improvements can be identified and implemented, which creates a cycle of continuous improvement.