CASE STUDY

Energy Conservation Measures

ABERYSTWYTH UNIVERISTY

PROJECT SUMMARY:

CLIENT
Aberystwyth University

PROJECT
£2.6m Energy Conservation Measures

PROJECT OVERVIEW

Aberystwyth University have set a target of 2030/31 to reach net zero and have undertaken an ambitious multi-phase energy reduction project which will have a substantial effect on the energy use of their buildings.

The University has approximately 8,000 students studying across 17 academic departments, some of which have complex scientific equipment, giving them substantial energy demands. In Phase 1 we focussed on the University's 32-hectare Penglais campus and looked at 20 of their buildings.

The £2.6 million project saw us install almost 4,000 light fittings, improve the air handling systems, replace a chiller, install insulation, and create bespoke solutions to upgrade the University's specialist laboratory equipment.

The guaranteed carbon savings for this phase were 802 tonnes per year, but the system significantly overperformed and generated a full 30% above this target.

VITAL SOLUTION

Vital Energi were chosen to provide an Investment Grade Proposal for the University. Whilst compiling this, Vital Energi surveyed all 20 buildings, assessed the performance of each energy asset and identified a range of improvements. Our team then created a model which showed the energy savings, carbon reduction and financial savings each of these upgrades would generate.

This is an important step as Vital Energi delivered an energy performance contract which guarantees the system will perform, ensuring a range of Key Performance Indicators are met. This has the added advantage of absorbing much of the client's risk and giving our clients budget certainty.

Once the solutions had been finalised with the client, our delivery team worked with the University and its stakeholders to develop an in-depth plan to carry out the work, creating the minimum disruption to the busy, live university campus. This included traffic and pedestrian management plans and scheduling work and deliveries for the least busy times.

Our team worked with building managers and curriculum staff to understand how the buildings are used and, where possible, ensured any shutdowns or disruptive work

THE BENEFITS:

- 20 buildings upgrades across the University's estate.
- 802 tonnes of carbon reduction delivered each year.
- 4,000 light fittings upgraded campus wide.
- Carbon reduction measures over-performed expected benchmarks.
- Energy Performance Contract which guarantees key performance indicators.

"The difference between Vital and the others was that they were more detailed. They quantified savings per asset. They thoroughly surveyed all buildings and gave a full, comprehensive ECM model with a lot of detail for each part and quantified the savings."

DEWI DAY- SUSTAINABILITY ADVISOR- ABERYSTWYTH UNIVERSITY

was scheduled outside of core times.

Ensuring the most carbon reduction within the budget

We have developed "Vital View", a bespoke software package which can interface with client's energy systems and assess the performance of each and every energy asset.

Once we have this baseline performance, we can then check it against more modern technologies which have come to the market and assess the improvement in efficiency. Once the upgrades have been made, Vital View will continue to monitor the system, including the new assets, to ensure they continue to perform optimally.

Creating Intelligent Buildings

We upgraded the Building Energy Management Systems at 18 buildings to ensure they were using energy as intelligently as possible. By understanding how the buildings are used, their occupancy times and historical usage, we can programme the building to use energy more efficiently.

The system is completely programmable and understands core elements such as occupancy and dormancy times, setting heating, lighting and ventilation to be used optimally as it is required.

By automating these processes, and programming the BEMS to account for seasonal variations, we were able to help the University reduce their carbon emissions by almost 290 tonnes per year.

Upgrading The Lighting System

One of the largest parts of this project was the installation of almost 4,000 light fittings, along with improved controls, across 9 buildings. We removed old fluorescent and incandescent bulbs with modern LED units which can be 90% more efficient and last 25 times longer. An additional benefit is that the units chosen are self-testing, which eliminates the lengthy process of each of the 4,000 units being manually tested by an engineer.

One unusual element of this process came about through the University's sports pitch. We identified that by replacing the old flood lights with new LED alternatives we could generate 750kWh of electricity savings.

By revolutionising the Penglais lighting infrastructure we not only saved over 330 tonnes of carbon, but significantly reduced the workload of the staff who need to replace bulbs much less frequently.

Upgrading the Air Handling System

We surveyed 42 of the University's air handling units, noting that they were older belt driven units, many of which had simple "on/off" controls, with no option for variable control. We calculated that 23 of these were ideal for replacement by more modern Electrically Commutated fans. These not only deliver improved motor efficiency, but have greater levels of control, allowing the BEMS to control them more precisely and more accurately maintain comfort levels.

All new fans had their own integrated Modbus network card which seamlessly integrated them into the BEMS, allowing their performance to be monitored.

Pipework Insulation

This solution can be underappreciated in favour of higher profile technologies, but reducing heat losses from uninsulated pipework can be one of the "quick wins" for organisations as they require very little preparation.

We installed over 900 pieces of pipework installation at 12 buildings on the Penglais Campus. This not only reduced the emissions by almost 60 tonnes per year, but has a payback period of under 4 years, making it extremely cost effective.

An Overperforming System Delivering More Carbon & Energy Savings

We designed the system to be efficient and for the BEMS to operate it optimally. We originally estimated that the scheme would save the university 802 tonnes per year, but after analysing the data for the first full year the project has reduced emissions by 1,042 tonnes per year.

This has seen the University reduce their electricity demand by 2.16 million kWh of gas and 2.32 million kWh of electricity. This makes a significant contribution to the University meeting its net zero obligations.

This electricity reduction was a key as Phase 2 saw the installation of a new 2.5MW solar farm and the energy conservation measures in phase 1 ensured that this would supply a greater percentage of the University's electricity needs.