



PROJECT SUMMARY:

CLIENT

University of Liverpool

PROJECT

CHP

TIMESCALE:

August 2013 –
June 2014

CONTRACT VALUE:

£8.9 million

OVERVIEW

Vital Energi have enjoyed a long relationship with the University of Liverpool, having worked with them for the last 6 years installing district heating and recently being appointed to a four year term contract.

The University has distinguished itself as a pioneer of sustainable energy and it is almost three decades ago that it installed its first 3.5MWe Combined Heat & Power (CHP) engine, which was the largest in an

education establishment at the time.

The University has committed to invest £350 million in its academic buildings and £250 million in its student accommodation and as part of that investment it has created one of the most advanced sustainable energy networks of any University in the UK.

The energy usage has increased substantially in the last few decades, going from 23 million kWh/yr in 1986 to 58 million kWh/yr in 2009.

CHALLENGE

The University of Liverpool bought the Royal Infirmary in 1994 after it had been closed for 16 years. The University chose the former boiler house and mortuary building to house its new energy centre and retrofitting a Grade II listed building from the 1890's brought with it some significant challenges. This meant that the contractor would need to deliver not only the engineering capital works, but also the complex building alteration and refurbishment elements of the project.

The building structure needed to be made safe and weather tight

and would have to support the extremely heavy CHP equipment while retaining its heritage features.

Approximately 25% of the project would involve building works which had to be delivered to exacting heritage standards and because the project was being retrofitted into a building not designed for that purpose it would involve large amounts of problem solving when it came to issues such as increasing the ventilation.

THE BENEFITS:

- > 48,000 accident free hours of work
- > Original 120 year old structure made safe, stable and waterproof
- > 21st Century energy system installed in a Grade II listed building
- > Campus, Community and Residential award winner at the 2014 ADE Awards

▶ Vital Energi and the University of Liverpool attend the topping out ceremony to mark the opening of the Liverpool University Energy Centre



“The University has worked very successfully with Vital Energi in the delivery of a number of strategically important projects that have been delivered within challenging programme and budgetary constraints.”

IAN MURRAY, PROJECT MANAGER AT UNIVERSITY OF LIVERPOOL

▶ THE SOLUTION

Over 6 years Vital Energi had been designing and installing the expanding district heating networks for the campus, now totalling 7km of pipe. The system involved the most accurate alarm system on the market, which can pinpoint leaks from between 1-3m and the Band Muff joint system which reduces heat loss and can help to increase the pipe's design life up to 50 years.

Designing an internal structure to accommodate the new, heavy plant equipment, while meeting the requirements of the Local Authority Heritage Officer was paramount to the success of the project and after close consultation with the University's architects we devised a 3 floor steel structure which took the stress from the load instead of putting it onto the 125 year old building. The steel frame would also involve minimal alterations to the actual structure.

By effectively creating a “building within a building” we were able to build a structure which could take the heavy plant and equipment which included two 23 tonne CHP engines on the first floor.

The project involved large amounts of restoration work to safeguard the original building. The original chimney was found to be peeling away from

the old mortuary and extensive work was undertaken to stabilize it. This entailed using a system called Helifix which involved raking all the mortar out at alternative levels, inserting a Helifix metal tie and then filling it with a resin first and then a lime based mortar which matched the look of the original materials.

The building would also need improved ventilation and Vital Energi designed an 11.2m by 4m “Penthouse Louvre section” to meet this demand. The one-piece, prefabricated steel section was craned onto the roof and installed in just one day. By prefabricating the Penthouse Louvre off site and installing it in one piece it cut approximately 6 weeks off the programme, saving time and money for the client.

Other work saw the roof of the old mortuary carefully removed, to allow access for equipment, before being meticulously replaced, with each numbered slate being put back into its original position, a task made more intricate due to the 37 different shapes and sizes of slate involved. Re-

slating work took a total of 16 weeks to complete. The project also saw 60 windows repaired, renovated or replaced with matching sashes.

THE CONCLUSION:

CHP 2 marks the highlight of Vital Energi's 6-year relationship with the university and will significantly contribute to its aims of reducing CO2 emissions while providing significant financial savings.

One of the main achievements of this job was demonstrating that it is possible to successfully retrofit a 21st century energy centre into a Grade II listed building without compromising performance or heritage features.

KPI SCORE

97%

Above industry standard achieved for communication and responsiveness at the University of Liverpool

Vital Energi have now also secured the 15 year operation and maintenance contract for the CHP2 project.