

C A S E S T U D Y

UNIVERSITY OF HERTFORDSHIRE ENERGY CENTRE



■ **KEY APPROACH FOR INTEGRATING RISKY INNOVATION IN THE PROJECT:**
MONITORING, PROPER MITIGATION AND PROBLEM SOLVING IN PARTNERSHIP

IMPACT ON BREEAM OUTSTANDING RATING: NONE

PROBLEM SOLVING IN PARTNERSHIP

An innovative but inadequate biomass energy plant has been replaced with a more conventional and better-performing system for supplying power for The University of Hertfordshire's student accommodation complex. The partners of concessionaire Uliving@ Hertfordshire can now reflect on completion of the University's Energy Centre as an example of risk management and problem solving in PPP projects.

Back in 2012, The University of Hertfordshire announced its preferred bid for the design, build, finance and operation of a 3000-room student accommodation complex in Hatfield. A key feature of that bid, submitted by a partnership

of contractor Bouygues and facilities operator Derwent Living, was the proposal for **operating the complex with zero net carbon emissions.**

This would come from use of an innovative bio-gas powered Energy Centre to be built on site and **fuelled by recycled wood-chip for generating both heat and electricity** for the new development. Use of this sustainable material would also raise revenue through the UK Government's system of credits available to generators and users of renewable energy.

Fast forward to the present, to find all 21 buildings of Hertfordshire University's accommodation complex complete and operational: occupied, but with a different more conventional Combined Heat and Power (CHP) plant in place.

The new CHP Energy Centre is fuelled by natural gas, so cannot boast quite the same strengths of sustainability but its installation does represent a success given that it was built after the biogas plant could not be delivered as planned. In retrospect, what was done with regard to the Energy Centre now stands as a

demonstration of risk management and **problem solving in public private partnership projects.**

Following announcement of the University's preferred bid, the special purpose vehicle (SPV) Uliving@ Hertfordshire - a partnership of Meridiam, Bouygues and Derwent, plus the University and Legal & General as minority shareholders - was formed to deliver and operate the University's accommodation project.

Financial close on the 50-year concession agreement between the University and Uliving@ Hertfordshire was reached in May 2013. Construction of the accommodation complex got under way just a month later. The complex would be delivered in three main phases, culminating with the commissioning of the Energy Centre to signal the end of construction and the start of the project's operational phase in the summer of 2016.

It was during initial stages of the main build phase, when Uliving@ Hertfordshire first identified the **Energy Centre as a significant risk** for the project, due to the biogas plant being new and hitherto **unproven technology.**



INITIALLY: WOOD-CHIP TECHNOLOGY



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The Chair of the board of Uliving@Hertfordshire is Meridiam Senior Investment Director, Richard Ashcroft. He says: "Our pre financial close analysis highlighted the Energy Centre as a risk, but at that early stage it was felt that mitigation was entirely feasible and that the risk could be contained within the financial parameters of the project."

The board of Uliving@Hertfordshire effectively took on the risk from the start of construction and it made the Energy Centre a very high priority for monitoring progress from there on. This materialised as the right policy, as further investigations carried out for the SPV revealed problems with the biogas plant beyond the fact that the technology was still in its infancy.

It was found that the **costs of construction and operation** of the biogas plant were likely to be a lot higher than initially envisaged, partly due to a lack of automation, demanding a high degree of manual intervention. A specific type of wood-chip fuel was required for the plant and **only one source of this particular material** was operating in the UK. This not only presented a very low security of supply, but also helped to push up the price of the wood-chip to around double its cost when the bid was first developed.

Further difficulties were encountered as the plant took shape on site. Emissions were higher than expected, with **significant emission** of particulate matter and an unpleasant odour, which alone presented a reputational risk

to the University. Plus, as early testing began, the contractor struggled to maintain continuous operation of the plant due to **frequent breakdowns**.

Despite these findings, the contracting team faced a difficult decision. The contractor stood to lose a considerable amount of money if it failed to deliver the biogas Energy Centre to the terms of its contract, so was initially reluctant to call a halt to its construction, without having absolute confirmation that the plant could not be delivered successfully.

Time was becoming a critical issue as well. If the biogas Energy Centre was not operational before the contract's long-stop date, Uliving@Hertfordshire would then be in default with regard to its concession



agreement with the University. The project lenders' investments were at serious risk of being devalued.

The response from Uliving@Hertfordshire was the introduction of a mitigation plan, including instruction to the contractor to demonstrate whether it could complete the Energy Centre satisfactorily in accordance with a series of tests.

"Key to this was the appointment of consultant Arup as an independent specialist," Richard says. "One of the critical things that Arup did was to develop **a test specification for the Energy Centre**. This proved to be a fundamental mitigation because **it helped the contractor to come to a final decision to abandon the plant**. Run tests showed the biogas equipment could not achieve the performance criteria specified, so the contractor was then able to conclude that an alternative solution had to be found. "From this point everyone involved worked together in real partnership and with positive co-

operation. The University, Uliving@Hertfordshire and the contractor in particular collaborated effectively to come up with a solution that worked within the financial parameters of the project."

Arup and the contractor's consultant WSP, also played important roles, working well together and with all of the partners to find an appropriate alternative plant for the Energy Centre. The process essentially involved drawing up a list of options and carrying out detailed analysis of each, all of which had to be carried out rapidly.

With a final long-stop deadline approaching, a Deed of Variation was needed to amend the concession agreement. This itself was a complex process. Getting it done, with all of the necessary contractual and financial obligations for operating the new Energy Centre agreed and signed off within a matter of months, was a significant achievement. The Chief Executive of Uliving@

Hertfordshire, Christian Stanbury, points to a couple of procedural reasons for such success:

"In hindsight it was important to get the Deed of Variation discussions started early, with no delay once the decision to redesign the Energy Centre had been made. Progress from there on was also helped along by having a subcommittee of the SPV dedicated to the Energy Centre and we made a point of keeping everyone informed of what was going on, including the local community and students," Christian says.

The Energy Centre had become a critical project in its own right, demanding significant resources. For Uliving@Hertfordshire, the costs were still manageable within the project's financial parameters, but the effort required in mitigation raises the question, why was the biogas plant proposed in the first place? It may have been a key factor in helping to win the contract, but given the ensuing



FINALLY: NATURAL GAS TECHNOLOGY



STUDENT HOUSING



problems, was the bid team wrong to include the biogas plant?

Richard Ashcroft is more phlegmatic in response: “Innovation should not be discouraged. It is necessary, but bid teams must ensure that projects are contractually and financially robust at SPV level for taking on the risk. In this case a financial analysis concluded that **the risk could be managed if dealt with pro-actively**” he says.

Uliving@Hertfordshire benefitted from identifying the Energy Centre as a key risk as soon as the SPV came together. Richard says: “Where risks exist, they have to be identified early, as projects begin, to **ensure that effective mitigating action** can be put in place if needed. It’s also essential that such risks are monitored closely by the SPV board.”

The University’s operational Energy Centre was successfully commissioned in June 2018 and now features a significantly larger gas-powered CHP engine, which means it is able to supply electricity for the University at a below-market rate. For the University this means that they are now saving money on electricity costs for the academic buildings on the campus and **the project has retained its ‘Outstanding’ rating awarded by the UK’s BREEAM** system for energy efficiency.

“Overall, the outcome is a very positive one,” Richard says. “The University is pleased with the way the project company dealt with the Energy Centre problems. It was a difficult situation, but on reflection, one that was well managed by all involved. To sum up briefly, all risks should be assessed early and monitored regularly. And where problems do occur, better results are achieved if all parties work with **real collaboration.**” ■

Uliving@Hertfordshire was formed by Meridiam, as 55% shareholder, with contractor Bouygues Development (13% shareholder) and the operator Derwent Living (13%). **The University of Hertfordshire has a 13% stake in the partnership** and Legal & General a 5% share hold.

The Uliving@Hertfordshire project has delivered a new development of 21 buildings with room to house just over 3,000 people at the University’s main College Lane campus in Hatfield. The accommodation complex was built and brought into service in phases; culminating in the University of Hertfordshire being presented with the prize for the Best Student Housing at the 2017 CUBO (College and University Business Officers) Awards.

Existing accommodation of 500 rooms was refurbished, with new buildings for 2,500 students delivered in three phases prior to the start of the 2016/17 academic year in September 2016. ■



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