



PROJECT SUMMARY:



CLIENT
University of St Andrews

PROJECT
Biomass & District Heating

TIMESCALE:
July 2015
- Ongoing

CONTRACT VALUE:
£25 million

OVERVIEW

The University of St Andrews harbours ambitions to become the UK's first energy carbon neutral university and in 2010 acquired the disused Guardbridge Paper Mill and developed plans to turn it into the "Guardbridge Energy Centre."

The £25 million project was not only seen as a way of lowering carbon emissions, but also of revitalising the Guardbridge area, creating jobs and ensuring much of the investment was spent locally and regionally to benefit the community.

CHALLENGE

The project is one of the largest biomass and district heating schemes in Scotland and involved converting the former 19th century Guardbridge Papermill into a 21st century energy centre which is capable of pumping the hot water through a 10.6km district heating network where it would serve 35 buildings on its North Haugh Campus.

The design would have to ensure minimum heat loss from the pipework, devise a way to cross the iconic Swilkenburn river and ensure an optimised layout of the new energy centre which included a 10m high 6.5 MW biomass boiler. In addition the

University were keen for the energy centre to be used as an education facility, so the designers were asked to create a solution which would allow easy access for groups ranging from primary school children to energy experts.

The final challenge would be to meet the University of St Andrews request to take them on a "learning journey", ensuring they were educated about all aspects of the project, meeting our supply chain, visiting their factories and having a solid understanding of the complete design and the decisions behind it.

THE BENEFITS:

- > Estimated 6,000 tonnes of CO2 reduction each year
- > Improved plant room configuration / layout
- > Improved district heating design bringing lower heat loss and increased savings
- > Gantry solution to allow ease of use as an educational resource
- > Additional future proofing for ease of modification/expansion

▶ One of the largest Biomass, District Heating schemes in Scotland.



“With the biomass at its heart, the former paper mill site is on the verge of a new lease of life which lends itself to the creation of a range of renewable energies and technologies which will keep the University among Europe’s leading research institutions. The Guardbridge project will breathe new life into local communities and re-establish the site as a key economic centre in Scotland, and has the capacity to generate hundreds of new jobs.”

DEREK WATSON
ACTING CHIEF EXECUTIVE AND CHAEMAN OF THE UNIVERSITY OF ST ANDREWS

▶ THE SOLUTION

Vital Energi’s core philosophy is to add value through exceptional design and this sees us work closely with the client and their professional team to create better, more efficient, longer lasting solutions which improve the long-term success of the project. To achieve this our 50-strong, BIM compliant design team use the latest software, such as Energy Pro, ADMS air quality flue dispersion, IES thermal modelling, CAD and 3D rendering programmes to thoroughly examine every aspect of the design and identify improvements and possible savings.

In this instance, the biggest success came from using bespoke Vital Energi software to model the network heat losses. This conclusively showed that while upgrading from Series 2 to Series 3 insulation would incur a small capital increase, that cost would be recouped many times over by the reduced heat loss during the course of the project’s lifecycle.

The client’s consultants had already specified the 10m high, 6.5MW Jernforsen biomass boiler and our team of designers and project managers travelled to their factory in Sweden at the Tender stage to meet with the design engineers and to tour live sites which had the same boilers.

Our designers built a 3D model of the Guardbridge Energy Centre very early on at the tender stage which allowed for easier communication with the client in helping them visualise the layout and key changes that were proposed.

Working closely and in partnership, it became clear that the University had plans to create further buildings on the Guardbridge site in the future, so our designers offered several acoustic enhancements to the design so that if residential buildings or libraries were built close to the energy centre they would not suffer from excessive noise from the plant. By identifying future proofing opportunities at this early stage, they can be included into the original design, making them not only more affordable, but also better integrated. As part of the project, The University of St Andrews were keen to educate themselves about all aspects of the project and Vital Energi’s designers and project team were happy to facilitate this, taking them on tours of the district heating pipe manufacturer in Denmark as well as visiting chipping plants and live biomass installations to ensure they had a strong, overall knowledge of the project and could make informed decisions throughout the design process.

THE CONCLUSION:

We recognised that on a project of this size, communication would be paramount and by building close relationships with the client, professional team, manufacturers and supply chain to ensure that we could deliver the a future proofed design to ensure a more efficient system which can be more easily expanded and modified in the future.

By creating an innovative gantry system Vital offered a solution which met the university’s requirements of making it easy to use as an education facility, while reducing health and safety risks.

The finished project will be one of the largest of its type in Scotland significantly reducing the University’s overall energy bill and also, crucially, reducing its carbon emissions.