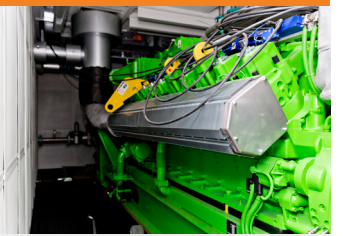


**PROJECT SUMMARY:**



**CLIENT**  
NHS Lothian

**PROJECT**  
St Johns Hospital Energy Centre

**TIMESCALE:**  
2018 - present

**CONTRACT VALUE:**  
£5.3 million

**PROJECT OVERVIEW**

NHS Lothian provide healthcare services across 21 hospitals including 4 major teaching hospitals, 126 GP practices, 180 community pharmacies, 173 dental practices, and 112 ophthalmic practices for patients across Edinburgh, East Lothian, Mid Lothian and West Lothian areas.

St John's Hospital is the main general hospital in Livingston and also acts as a teaching hospital for the University of Edinburgh Medical School. Containing 543 beds, a 24 hour accident and emergency department, and a range of specialist services including burns treatment and plastic surgery, the hospital is in constant operation and

so maintaining efficient and reliable energy supplies is crucial.

To ensure resilient energy supplies are maintained to the hospital, Vital Energi replaced the existing centralised energy generation system within the energy centre to improve the efficiencies of energy supply and deliver significant cost and carbon savings. Vital Energi designed and built the new energy generation system, and provided comprehensive O&M of the new equipment for 25 years under an energy performance contract. We also guarantee the savings generated by the new energy system over the 25 year contract term.

**VITAL SOLUTION**

The hospital had an existing 30 year aging steam boiler system which was reaching end of life and was in need of replacement. We proposed a CHP solution that would see the four aged steam boilers replaced with two 5MW steam boilers, a 6.7MW combination fired and waste heat steam boiler

and a 1.5MWe CHP engine. The energy centre upgrade would also see the installation of new chimney flues and a smart SCADA monitoring system which would monitor, control and optimise the energy scheme to maximise its efficiencies. The project also included an innovative method of

**THE BENEFITS:**

- > Innovative laundry waste heat recovery system saving over £26k in energy costs each year.
- > Guaranteed savings of 2,649 tonnes of carbon and £644,000 in energy costs per year for 25 years.
- > Value engineering at tender stage to identify issues with existing flues
- > Construction schedule that reduced disruption to hospital and increased installation efficiencies.

▶ The Health Board desired a solution that would be adaptable in the future to include new technologies that were less reliant on fossil fuels. We ensured the solution was flexible with the possibility to replace the CHP engine at the end of life to accommodate renewable systems in later years.



*“Vital’s engineering design and construction management approach delivered on our high expectations, and that continues as we move into operations. The solution and team, support our strategic aims of delivering significant savings and maintaining safe and resilient critical energy infrastructure.”*

DANIEL MILL - SENIOR PROJECT MANAGER SUSTAINABLE & TECHNICAL DEVELOPMENT FACILITIES DEPARTMENT  
NHS Lothian

recovering heat from the hospital’s laundry system.

#### **Value engineering a solution at tender stage**

During the tender stage, we identified issues with the aging internal flues of the boiler house which posed risks of interruption to the steam supply to the hospital. We suggested that these flues should be replaced with new stainless steel flues to extend the lifespan and increase the reliability of the scheme.

#### **Engineering excellence through innovative design of a laundry waste heat recovery system**

We identified that there was significant heat that was emitted from the laundry area which was otherwise going to waste, and so we provided a solution that would capture this wasted heat to generate some of the heating and hot water for the hospital. We designed a system that would divert the high temperature condensate return into a new 300kW plate heat exchanger to transfer the waste heat emitted from the laundry area and convert it into low temperature hot water which would then be distributed around the hospital’s heating system. This provides significant carbon and

financial savings for the scheme, with this innovation along generating financial savings of £26,249 per year.

#### **Meeting future aspirations and taking the client on the project journey alongside us**

The Health Board desired a solution that would be adaptable in the future to include new technologies that were less reliant on fossil fuels. We ensured the solution was flexible with the possibility to replace the CHP engine at the end of life to accommodate renewable systems in later years.

We wanted to ensure the client was part of the project at every step and so took some of the NHS Lothian team to visit the Jenbacher factory in Austria to witness the CHP factory testing prior to its shipping to Scotland for installation at the hospital. This allowed them to see the engine up close and running at full electrical output to enhance their understanding and guarantee the quality of the product.

#### **Completing weekend deliveries to minimise disruption to hospital**

St John’s is a major hospital with constant operation and so a key priority was to ensure that there would be no disruption to the energy supply and little disturbance to

normal hospital operations during construction. We therefore took the decision to remove and deliver major plant over two weekends when there would be a reduced number of staff and out patients, keeping accessibility restrictions to a minimum.

The first weekend saw the first aged boiler removed and the delivery of two 5MW steam boilers, and the second weekend saw the removal of the remaining two aged boilers and the delivery of the 6.7MW boiler and 1.5MW CHP engine. Completing the work in stages was beneficial for two reasons: firstly, it allowed us to quickly install key plant in short time periods which reduced any inconvenience to the hospital; and secondly, it ensured that there was no down time in energy supply as there was always at least two boilers running at any time.

#### **Guaranteeing savings for a period of 25 years in an energy performance contract**

We have entered into an energy performance contract with the Health Board which guarantees the savings of the project for a period of 25 years. This will see savings of 2,649 tonnes of carbon\* and a reduction of £644,000 in energy costs each year.

\*Carbon savings calculated using factors at the time of project bid.