

**Clarke
Energy**[®]

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Engineer - Install - Maintain

Case Study | Natural Gas | UK

Southend Hospital

Hospital reaping the financial benefits from an onsite combined heat and power scheme.





Key information

Client
Southend University
Hospital

Capacity
1.2MW_e

Location
Southend, UK

Commissioning
2017

Engine Manufacturer
GE (Now INNIO
Jenbacher)

Installation by
Clarke Energy

Type
1 x JMS416

Primary Fuel
Natural Gas



Southend Hospital Reaping Financial Benefits of CHP

Southend Hospital, which forms part of Mid and South Essex NHS Foundation Trust, along with Basildon Hospital and Broomfield Hospital, is reaping the financial benefits from an onsite combined heat and power (CHP) scheme.

The 1.2MW plant, utilising an INNIO Jenbacher high-efficiency engine, was designed and installed by Clarke Energy in December 2017. Since commissioning, the scheme has dramatically cut energy bills **saving the trust £1.94 million** (Dec 2017 – Dec 2020).

The CHP plant utilises natural gas to efficiently generate green electricity on-site, rather than importing from the National Grid. Waste heat from the CHP process is captured to efficiently heat hospital buildings.

Southend Hospital originally heated buildings via three hot water boilers, homed within an onsite boiler house. The Trust's sustainability impact group looked at ways to reduce costs, whilst increasing building resiliency. A detailed energy audit secured the decision to make critical energy system upgrades, including CHP.

“While families were putting Christmas decorations up and preparing to cook their turkeys with power from remote power stations, more than three quarters of our power was self-generated by low carbon electricity – that’s enough to power 3,000 houses a year. CHP is a win-win for us as it provides social, economic and environmental benefits.”

Manoj Chohan, Head of Sustainability Southend Hospital

Combined heat and power
plant at hospital



Engineered, installed and
maintained by Clarke Energy



Output capacity via
JMS416 engine

1.2MW_e

Clarke Energy's engineering and project teams developed a close working relationship with Southend Hospital to design a scheme that included:

- Improvement works to the low loss header - increasing efficiency and reducing spurious mixing of hot water
- Seamless integration into the building's existing hot water system
- Electrically - interfacing to the mains incomers
- Extending the HV ring-main unit
- New CHP exhaust system, clad in goose grey to blend it in with surrounding environment
- Integration with the trust's existing BMS
- Remotely mounted cooling dump radiators, situated on the energy centre roof

Clarke Energy designed and constructed a purpose-built low noise acoustic enclosure, including ventilation system to meet the stringent noise criteria specified by the Trust.

The CHP is hydraulically separate from the existing boiler plant but is configured to constantly provide hot water to the hospital network. The 3 existing boilers act as back-up heat. The scheme is electrically led, in parallel with the national grid but with no export facility.

A 15-year maintenance agreement ensures reliable engine performance and optimum efficiency throughout its full lifecycle.

Manoj Chohan, Head of Sustainability Southend Hospital, commented:

"While families were putting Christmas decorations up and preparing to cook their turkeys with power from remote power stations, more than three quarters of our power was self-generated by low carbon electricity – that's enough to power 3,000 houses a year. CHP is a win-win for us as it provides social, economic and environmental benefits.

Looking ahead, MSE is planning to replicate and build on the success of the CHP at Southend, having

secured a £29.5m package of energy efficiency measures to fund energy cost saving and carbon reduction initiatives at our Broomfield and Basildon Hospital sites.

Financed by the Public Sector Decarbonisation Scheme (£8.5m) and an interest free loan for the remaining £21m, the improvements include the installation of two CHPs at Broomfield and Basildon Hospitals.

Other improvement measures include the replacement of these hospitals steam generating infrastructure (hot water and heating) which is tired and costly to run and repair. Modernising the steam system will deliver improved sterile services performance and resilience with similar improvements to air handling systems in theatres.

There will also be fabric upgrades to windows and insulation which will improve energy and heating performance and boost patient and staff comfort levels in our buildings. Other plans outside of this package include introducing state of the art heat pump systems, solar panels, electric vehicle chargers and central battery storage facilities, which will enable us to generate electricity using renewable energy, create green jobs and support the transition to net zero.

We're leaving no one behind as we push forward with our green ambitions and commitment to achieving carbon net zero across our hospitals group. We are also working on a new Green Travel Plan to encourage healthier, more affordable and environmentally friendly staff travel and we are working with the Essex Climate Commission to ensure we play our part to help ensure Essex has a bright and green future.

Our sustainable development work is about embracing every opportunity to make a difference environmentally, socially and financially to create an organisation that is fit for the future and supports the wellbeing of our staff, patients and the wider community."



**Supporting
Net-Zero**



**Energy
Resilience**



**Energy
Efficiency**

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