

CHP puts town hall heating back on track

A combined heat and power (CHP) system working in tandem with condensing boilers has helped Nuneaton Town Hall get over some serious heating problems and dramatically reduce energy demand.

Nuneaton and Bedworth Borough Council in Warwickshire had been having a lot of trouble with its ageing heating plant. The Council's M&E/energy officer set out to project manage, design and commission new modern technologies to replace the existing dilapidated assets with the help of leading service providers from Baxi-SenerTec, Potterton and Isis Controls. The project was tendered out and Envirotech were selected as the main contractor to deliver the comprehensive works.

Now an integrated DACHS mini-CHP system and four Potterton Eurocondense Plus 160 boilers have taken the place of the seven existing gas-fired boilers and two gas-fired water heaters at the Town Hall.

The original boilers, installed in mid-eighties, were obsolete and spares were not readily available. The boilers were also prone to faults, breakdown and high maintenance repair costs.

Brent Davis, the council's assistant director for asset management and strategic development said: "In 2001, similar boilers in the council offices next door were replaced and all serviceable parts were salvaged to prolong the life of the boilers in the Town Hall. These parts were all used up by 2003. Eventually, three of the seven boilers were not working at all.

"We had two serious plant room floods because old pressure relief valves failed," he added. "Another undetected flood affecting the electrical distribution and building management systems could have cost us thousands of pounds."

Standards

On top of this, the old boilers did not meet the energy efficiency requirements and carbon emission standards set by the council and the Government.

The four new Potterton Commercial condensing boilers were set up in a linear line formation on the original boilers' concrete plinth base and the packaged, ready-to-install DACHS mini-CHP was installed alongside.

Generating electricity as well as heat, the DACHS mini-CHP unit, which is manufactured by Baxi group company SenerTec GmbH in Germany, is a far more energy efficient way to provide both heating and power for the Town Hall and has led to less reliance on centralised power generation. The DACHS unit also operates as the lead boiler for both heating and hot water. It produces 12.5kW thermal output and 5.5kW of electricity which is used for the site's electricity requirements.

The low NOx Eurocondense Plus 160 boilers, which incorporate a modulating pre-mix burner, offer a full load efficiency of 86 per cent gross and a part load efficiency of 96 per cent gross. The new boilers are set-up in series with the four units together giving a maximum output of 612kW. Each is sequence controlled for even running periods.

The whole system at the Town Hall is controlled by local interfaces and the council's networked building energy management system, which ensures that the boilers only operate when required to provide additional heating and hot water capacity.

The DACHS, which is based on reciprocating engine technology, has been sized to deliver the base load for the building. The secret with the CHP is to ensure that the engine is running for as long as possible to generate low cost electricity.

Operating reliably and successfully across Europe for many years, it is proven technology and has become the number one choice in mini-CHP. Almost 20,000 units have now been installed by Senertec GmbH, and its partner network.

Mr Davis concluded: "CHP is an extremely efficient way of producing usable heat and generating electricity simultaneously at the point of use. CHP offers an economic and environmentally friendly alternative to meeting thermal and electrical demands in many applications.

"By generating heat and electricity from a single source, CHP can deliver overall fuel efficiencies well in excess of 75 per cent. The DACHS reduces primary energy needs by up to 30 per cent compared with electricity generated from a centralised power station, and the use of heat only boilers.

"This considerably reduces energy costs and delivers significant reductions in harmful greenhouse gas emissions."

BENEFITS OF DACHS MINI-CHP AT A GLANCE:

- Substantial carbon and economic savings.
- The ability to displace electricity that would normally be bought from the National Grid.
- Integral control panel with modem for off-site monitoring.
- Condenser option for system efficiency and increased thermal output.
- User friendly controller keypad and display.
- A range of fuel options, including natural gas and LPG.
- 5.5kWe gross electrical output, depending on fuel type.
- Overall fuel efficiency between 79 and 92 per cent.
- Compact, integrated package design.
- Noise levels as low as 52 dB(a) at 1m.
- Easy installation and operation.
- Approx 80,000 running hours design life.

- Up to 10 DACHS can be installed in a multi-module arrangement.
- Complies with G83/1 recommendations for SSEG.

PIC CAPTION: *The photos show Nuneaton Town Hall plant room before and after the heating system refurbishment.*

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