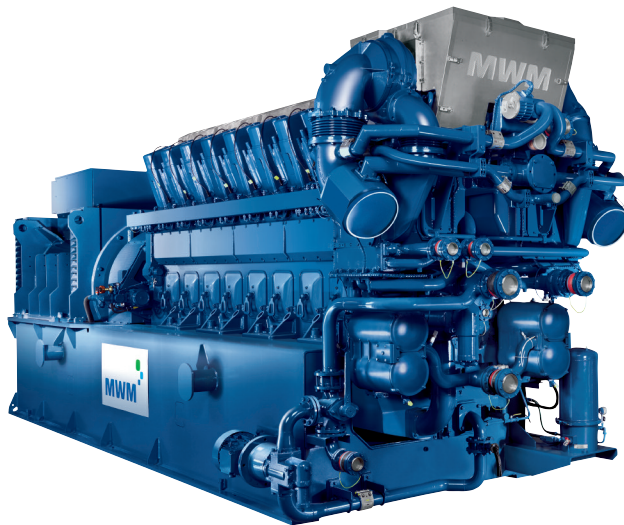


## **E.on** awards prestigious Citigen engine replacement order to **Edina**

**E.on** have awarded Edina UK Ltd the contract to replace the existing CHP engines at their prestigious central London Citigen project with, initially two new MWM TCG2032V16 high efficiency gas powered generators, with a further two to follow shortly.

Chosen for their high efficiency and renowned reliability the MWM products were recognised as the best fit for purpose and combined with the proven Edina Operation and Maintenance support package made this the winning combination

Work is well under way and the new generators are due to be commissioned by the beginning of 2015.



The legendary MWM TCG2032V16 is capable of generating 4.4MWe powered by natural gas and is renowned for its rugged reliability, high efficiency and low operating costs.

MWM is the worlds leading and oldest manufacturer of gas powered engine generating equipment.

## The City of London Combined Heat and Power System (Citigen History)

Combined Heat and Power (CHP) is an energy efficient method of generating heat and electricity in a single process, saving fuel and reducing emissions. It can operate on a very small scale (micro-CHP for domestic applications) up to extremely large scale (serving industrial plants or entire city communities).

A large scale CHP-based community energy system has been operating in the City of London since 1993. It comprises a central power station and a district energy network supplying heating and cooling to customer sites, and is one of only two such systems in the UK. The scheme was an attractive proposition to a CHP developer on a commercial basis as:

- The City area offers a high load density with a good mix of buildings, new and old
- The Corporation's own buildings could provide the initial heating, cooling and electrical loads
- Future loads would come from the private sector and other public authorities
- A site was available for a power station
- Existing subways and basements were available for pipe and cable routes, and
- The system would benefit from the powerful backing of the Corporation itself



Following a competition Citigen (London) Ltd was selected as the 'ESCO' (Energy Services Company), and has developed and operated the system to date. A 25 year 'co-operation agreement' between Citigen and the City Corporation forms the main legal contract, in addition to which there are a number of separate supply agreements for heating and cooling supplies to individual sites and pipework licence agreements. Under the agreement, Citigen is responsible for the design, development, financing, and operation of the scheme and carries the commercial risks; the City Corporation gives support and planning advice, and encourages private customers to consider CHP energy supplies. It has also leased original boiler plant at two sites for system back-up purposes. Since 2002 Citigen has been a wholly owned subsidiary of E.on (UK) plc.

The system is based at a central power station near Smithfield Market constructed behind the retained façade of a former cold store. It supplies heat (as hot water) to 10 of the City Corporation's properties, including Guildhall, Smithfield Market and the Barbican Centre, via an underground pipe network. Private customers are also supplied, including a sheltered housing unit for the elderly. Cooling (as chilled water for air conditioning systems) is also provided to 6 properties via a separate parallel underground pipe network. Chilled water is generated mainly by absorption chillers which utilise heat from the engines as their main energy source, and are thus well suited for this application. Electricity generated is conveyed to the local distribution grid and sold through Citigen's parent group. This type of system is sometimes known as 'tri-generation'.

## The main plant

The original CHP plant was based on two very large V18 compression-ignition reciprocating engines, adapted for dual fuel operation, capable of running on either natural gas or oil. Each engine produces 12 Megawatts of heat and is coupled to an 11kV alternator with an output of 15.6 Megawatts. Emission control equipment removes up to 95% of the NOx content of the exhaust gases.

Heat is recovered from engine exhausts, turbochargers, jacket cooling, and lubricating oil and transferred via heat exchangers to the district heating network. The absorption chillers are also supplied with heat. Any surplus heat produced is dissipated to atmosphere by cooling towers.

The operating regime of the engines is dictated by prevailing electricity and gas prices.

Typically one engine operates during the day but not overnight or at weekends.

When the engines are not operating heat supplies to the network are maintained by back-up boilers.

Chilled water is generated by two absorption chillers each rated at 5.6 Megawatts manufactured by Trane. Electrically powered chillers provide a further 3.3 Megawatts of cooling and are used when engines and absorption chillers are offline.

The district energy network extends for a total distance of 3.6km through the north western parts of the City, with a branch running north into Islington. For ease of installation and access, the majority of the pipework and cables makes use of existing subways, basements and car parks with the rest buried under roads.

## Benefits

The City Corporation benefits directly from the CHP system in a number of ways:

- Financial savings through lower energy charges
- Significant CO2 emissions savings
- Citigen profit sharing scheme
- Support for its Environmental Policy, Local Agenda 21, and Community Strategy
- Elimination of Health & Safety risks associated with cooling towers
- Removal of CFC and HCFC refrigerant gases in original cooling plant
- Space savings

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