

# Clarke Energy

Engineer - Install - Maintain



Distributor & Service Provider  
Gas Engines

# Hospital Cogeneration

Combined heat and power



# Hospital Cogeneration

Clarke Energy is the authorised distributor and service partner for GE Energy's gas engine division in a growing number of countries across the world. In addition to providing high-efficiency, reliable gas engines we combine this with the expertise and resources to deliver unbeatable product support.

Whether your requirement is for the supply of a single gas engine generator or a complete turnkey power generation facility, we can meet that need. Our ability to add value by offering an end-to-end service, from initial proposal to reliable long-term maintenance, has led to us becoming a multi-national company with operations in ten countries across the globe. Our company prides itself on integrity, delivering only the highest quality products whilst providing a reliable accountable localised service.

**Benefits of working with Clarke Energy**  
Clarke Energy provides flexible solutions for your gas generation projects. Our services range from the supply of a gas engine generator, through to the complete turnkey installation of a gas powered generation facility. Clarke Energy has a dedicated, top-quality team of sales, engineering, project management, commissioning and maintenance staff to meet your needs. We also offer long-term maintenance contracts backed up by a strong balance sheet, giving peace of mind with respect to the long-term performance of your GE gas generation equipment.

## Cogeneration for Hospitals

There is increasing pressure on the hospitals and healthcare sectors to improve efficiency. With respect to energy this takes three key forms –

- Making limited financial resources go further
- Improving energy efficiency
- Reducing carbon emissions

Using a combined heat and power (CHP) plant in a hospital is an ideal way of achieving each of these three targets. Natural gas is a clean-burning low carbon emission fuel. A CHP plant facilitates the high efficiency use of this fuel, by recovering not only electricity but also heat.

When a hospital purchases both electricity from the national grid and in parallel gas or another fuel for heating this can lead to high costs. Using a gas engine-based CHP plant facilitates the purchase of a single fuel source to achieve both the production of electricity and heat. The conversion efficiency of a gas engine is very high (>90%) and therefore can result in long-term operational cost savings for the hospital.

Hospitals by their nature are high energy consumers. Energy usage in hospitals takes a number of forms including:

- Electricity – required to power the lighting and equipment of the facility
- Hot water – For cleaning & general use
- Steam – For sterilisation, cleaning (more applications needed)
- Cooling – For refrigeration, freezing and air conditioning systems.

Each of these energy types can be produced at high efficiency with the assistance of a combined heat and power facility.

## Benefits

- Energy savings that can be diverted to fund the treatment of patients.
- Financial benefits compared to the separate purchase of electricity and heating fuel.
- Environmental benefits related to reduced carbon emissions.
- Flexible technology that can be used to provide electricity, heating and cooling if required.

**Spend less  
on energy  
and more on  
treatment**

Great Ormond Street Hospital, 1 x J420 – 1.4MWe



Christie Hospital, 1 x J420 – 1.4MWe



Guys and St Thomas' Hospital, 1 x J620 + 1 x J620 – 6MWe total



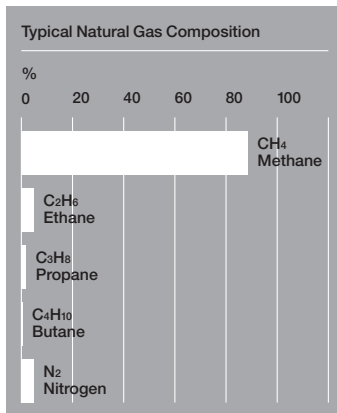
Photo: Nigel Cox

## Natural Gas

Natural gas is an abundant, clean low-carbon fossil fuel that can be readily utilised for the production of electricity. The high efficiency of the GE Jenbacher gas engine is well suited to the provision of reliable decentralised electricity utilising natural gas as a fuel.

The utilisation of natural gas in gas engines is characterised by the lowest carbon dioxide emission levels of all fossil fuels. Due to the fact natural gas is low in carbon, but has a high hydrogen content, natural gas has the most favourable carbon dioxide balance. The combustion of natural gas produces around 40-50% less carbon dioxide than when coal is burned to produce the same amount of energy. Notably it also has low emissions of sulphur dioxide (SO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>) and particulate matter.

As a fuel, natural gas is set to become a significant source of power in the coming years. Natural gas is projected to become the most significant fossil energy medium in the next fifty years.



## Application

Natural gas generators can be configured in a number of ways. In addition to the production of electricity, generators can also provide heating as hot water or steam, cooling water and clean carbon dioxide.

- Cogeneration or combined heat and power (CHP)
- Trigeneration of combined heat, power and cooling (CCHP)
- Quadgeneration or CCHP with carbon dioxide recovery
- Island mode operation –power production isolated from the electricity grid

Natural gas generation relies upon a well-developed and stable natural gas supply.

## Our Competence

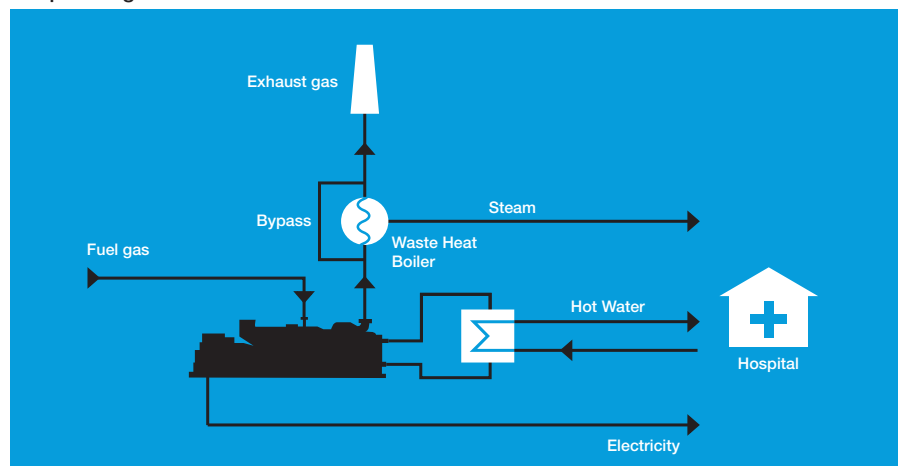
Clarke Energy has a long and extensive experience in the engineering, installation and maintenance of combined heat and power plants for hospitals.

The GE Jenbacher gas engine is known for having the highest levels of electrical efficiency on the market. When coupled with a contractual maintenance agreement with Clarke Energy, it will give peace of mind to the customer that they will achieve the highest levels of availability and have constant returns on their investment.

Preston Hospital, UK, 1 x JMS616



## Hospital Cogeneration Schematic



If you would like to find out more about natural gas based power, please contact your local Clarke Energy office.

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#### Algeria

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28 rue des Tourelles  
Wilaya - Hydra  
Alger  
Algeria  
Tel. +213 21 69 42 52  
Fax. +213 21 69 42 52  
algeria@clarke-energy.com

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#### Australia

---

Building 1  
2-4 Stirling Street  
Thebarton  
South Australia 5031  
Adelaide  
Australia  
Tel. +61 (0)8 8290 2100  
Fax. +61 (0)8 8443 5848  
australia@clarke-energy.com

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#### France

---

Z. A. de la Malle  
RD6  
Bouc Bel Air 13320  
France  
Tel. +33 (0)4 42 90 75 75  
Fax. +33 (0)4 42 90 75 76  
france@clarke-energy.com

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#### India

---

Shivkiran, Plot No. 160  
CTS No. 632  
Lane No.4  
Dahanukar Colony  
Kothrud  
Pune 411038  
India  
Tel. +91 20 30241777  
Fax. +91 20 30241800  
india@clarke-energy.com

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#### Ireland

---

Unit 7  
Newtown Business Park  
Newtownmountkennedy  
County Wicklow  
Ireland  
Tel. +353 (0)1 281 0010  
Fax. +353 (0)1 281 0520  
ireland@clarke-energy.com

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#### New Zealand

---

Unit 5  
56 Pavilion Drive  
Airpark II  
Mangere  
Auckland 2022  
New Zealand  
Tel. +64 (9) 256 9910  
Fax. +64 (9) 256 9912  
newzealand@clarke-energy.com

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#### Nigeria

---

28, Joel Ogunnaike Street  
GRA  
Ikeja  
Lagos  
Nigeria  
Tel. +234 (0)181 567 23  
nigeria@clarke-energy.com

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#### Tanzania

---

Regus Centre  
7th Floor  
Amani Place  
Ohio Street Office Park  
Dar es Salaam  
Tel. +255 (0) 222 196817  
tanzania@clarke-energy.com

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#### Tunisia

---

Résidence Saray du Lac  
Appt n°B.2 – 1er Etage  
Les Berges du Lac  
1053 Tunis, Tunisie  
Tel. +216 (0)71 962 062  
Fax. +216 (0)71 962 059  
tunisia@clarke-energy.com

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#### UK Head Office

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Power House  
Senator Point  
South Boundary Road  
Knowsley Industrial Park  
Liverpool L33 7RR  
United Kingdom  
Tel. +44 (0)151 546 4446  
Fax. +44 (0)151 546 4447  
uk@clarke-energy.com