Clarke Energy®

Engineer - Install - Maintain

Natural Gas

Energy Efficient Power Generation

JENBACHER

INNIO

Distributor New Units & Services

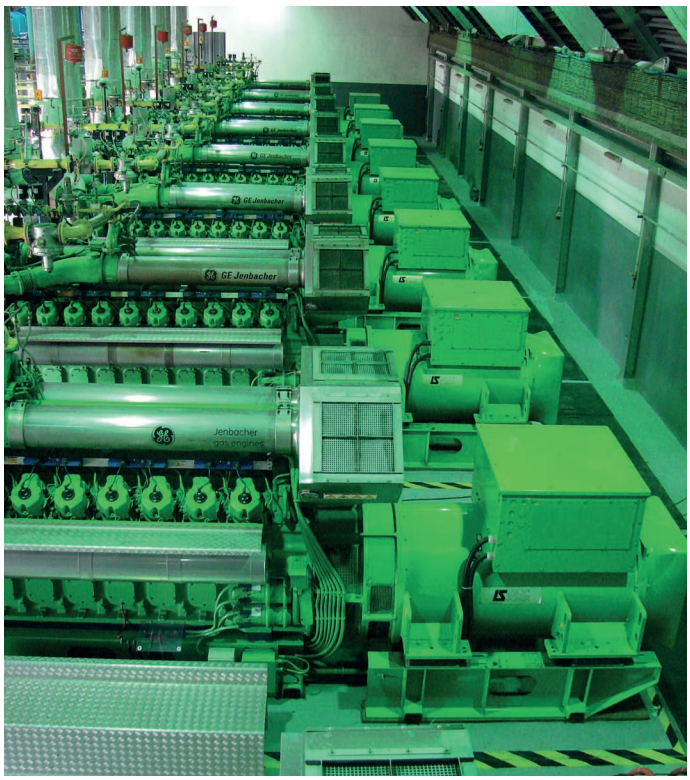
Natural Gas

Clarke Energy is a multinational specialist in distributed power generation technology. Our scope ranges from the supply of a gas or diesel fuelled power generation engine, through to the turnkey installation of a multi-engine power plant. Clarke Energy is an authorised distributor and service provider for INNIO's Jenbacher gas engines. The business has a strong focus on aftersales support; developing in-country resources to service and maintain our facilities, along with original equipment manufacturer approved spare parts. Our aim is to provide high quality products and installations supported by a reliable, accountable and localised after-sales service. Integrity is a core company value and Clarke Energy operates to the highest international standards of compliance.

Benefits of working with Clarke Energy

— Quality products, balance of plant and installations products mean high technical and environmental performance hence maximum returns for our customers.
— Our installations are backed up by the highest levels of localised aftersales support, meaning maximum reliability of the power generation assets we supply.
— Extensive engineering experience across a range of gases and applications, meaning tailored, optimal power generation solutions for our customers

Flour Mills, Lagos, Nigeria, 11 x JMS620



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 Jenbacher gas engine is well suited to the provision of reliable decentralised electricity utilising natural gas as a fuel.

Natural gas originates from plant and animal matter which decomposed millions of years ago and is now located in reservoirs under the Earth's surface. Natural gas is primarily comprised of methane with other gases in smaller proportions.

The concentration of gases contributing to climate change is increased by human activities, particularly by the utilisation of fossil fuels in industrial processes and agriculture. 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_2), oxides of nitrogen (NOx) 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.

In countries where the national grid is unreliable and supplies of natural gas are abundant, gas engines provide an excellent source of reliable island mode power.

Benefits

— Reliable production of electricity at high efficiency
— Financial benefits compared to separate purchase of electricity and heating fuel
— Flexible and can be used to provide heating, cooling and clean carbon dioxide
— Cleanest fossil fuel with lowest relative carbon emissions

Preston Hospital, UK, 1 x JMS616

Methane Number

The methane number provides an indication of the knock tendency of the fuel. It is a product of the different constituent gases within the natural gas, particularly the proportions of methane, ethane, propane and butane.

Methane, which has high knock resistance, is given an index value of 100. Hydrogen, which burns quickly relative to methane, has low knock resistance and is given the index value of 0. If a gas mixture has a methane number of 80, its knock resistance is equivalent to that of a gas comprised of 80% methane and 20% hydrogen. There are gas constituents which have a higher methane number than 100 therefore it is also possible for a gas composite to have a higher methane number than 100.

Understanding the methane number of the natural gas fuel is an important factor when determining the appropriate engine version to select.

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.

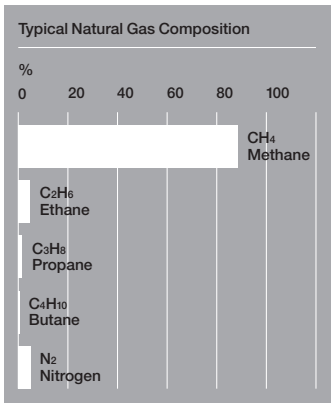
- Cogeneration or combined heat and power (CHP)
- Trigeneration of combined heat, power and cooling (CCHP)
- Greenhouse cogeneration / CHP with carbon dioxide recovery
- Quadgeneration or CCHP with carbon dioxide recovery
- Island mode operation –power production isolated from the electricity grid

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

Our Competence

Clarke Energy has extensive multi-national experience in the engineering, installation and maintenance of natural gas generation facilities.

Jenbacher gas engines are 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.



Deepak Nitrite Limited, Nandesari, Gujarat, India, 2 x JMS420

Clarke Energy, a Rehlko Company, is a multi-award-winning global business specializing in the engineering, installation and maintenance of distributed energy solutions.

Clarke Energy supplies a range of different energy efficient, resilient, low carbon and renewable power generation and storage technologies. For gas based projects we are able to produce or accept renewable and low carbon fuels including hydrogen, biogas and biomethane / renewable natural gas (RNG).

To contact Clarke Energy please visit our website:
www.clarke-energy.com