Clarke Energy®

Engineer - Install - Maintain

Associated Petroleum Gas (APG)

Emissions Avoidance From Flare Gas

JENBACHER

INNIO

Distributor New Units & Services

Associated Petroleum 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

Associated Petroleum Gas / Flare Gas

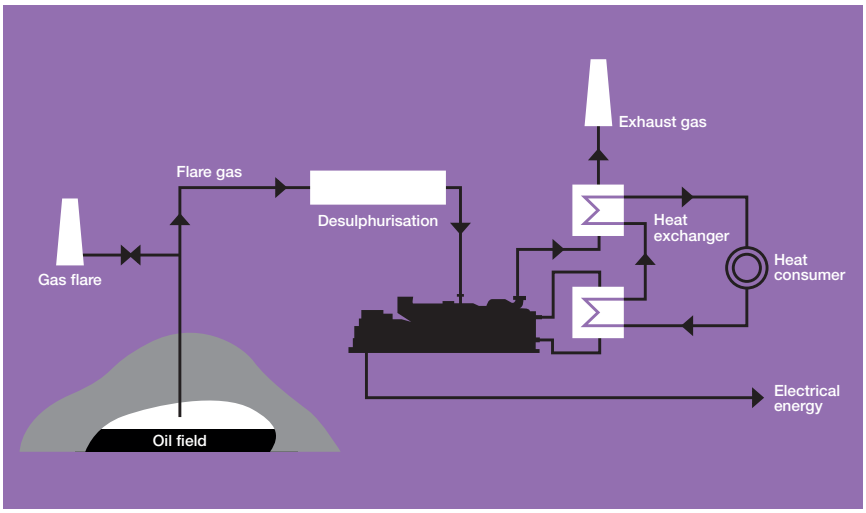
Associated petroleum gas (APG) is also known as flare gas. APG can be converted to power at high efficiency utilising INNIO gas engines which include the Jenbacher and Waukesha product ranges. This power can be used for the provision of electricity and heating on-site whilst eliminating the cost of diesel deliveries to remote areas. The utilisation of APG as a fuel for a generator is an excellent way of reducing carbon dioxide emissions that might otherwise result from diesel fuel consumption.

Benefits of APG as a Fuel Gas

— Reduces operational costs associated with diesel generators
— Utilisation of a gas often treated as a 'waste' product
— Reducing carbon emissions
— A local fuel supply that produces stable electrical and thermal power

New Plymouth, New Zealand, 2 x JGC320

Associated Petroleum Gas Schematic



Creation of Associated Petroleum Gas

Natural gas that comes from oil wells is typically termed ‘associated gas’. This gas can exist separate from oil in the formation as free gas or it can be dissolved in the crude oil. Independent from the source of the natural gas, once separated from crude oil it commonly exists in mixtures with other hydrocarbons such as ethane, propane, butane and pentanes In addition, raw natural gas contains water vapour, hydrogen sulphide (H_2S), carbon dioxide (CO_2), nitrogen (N_2) and other compounds. Associated gas that contains such impurities cannot be transported easily and also cannot be used without treatment since it is recovered during the oil production process.

For a long time, oil producers have simply flared this unwanted oil by-product. But because of the increase in both environmental consciousness and energy demand, flaring is often avoided and is sometimes prohibited.

Technically, several options exist for handling associated gas:

- Preparing it as a fuel in various forms (i.e. dried pipeline gas, LPG and exporting it via a pipeline)
- Gas reinjection for later recovery
- Generation of electricity for transmission or on-site needs
- Processing such as LNG or LPG and exporting via tankers
- Conversion to petrochemical industry feedstock
- Processing gas-to-liquids and gas-to-solids
- Conversion to other forms of energy for such uses as thermal for district heating

The Jenbacher Gas Engine Concept

In most cases, installations of power generation with associated gas are in remote areas. Power supply in such areas – if it exists at all is often poor. Therefore, the common solution in the past was to use diesel gensets. Due to rapidly rising oil and consequently diesel fuel prices, this solution has become increasingly uneconomical. Furthermore, the supply of diesel fuel and the necessary storage also are becoming more expensive.

The composition of associated petroleum gas is often well suited for the combustion in gas engines. However treatment in the form of dehumidification and removal of condensable hydrocarbons from the gas is generally required. Due to the often relatively high content of higher hydrocarbons, a de-rating of the nominal natural gas output may be required. In the case of a high concentration of H_2S, desulphurisation of the gas may also be needed. The gas that is treated in the above-mentioned way is a valuable fuel for the independent power supply with gas engines. The engines are normally installed in containerised units with all peripheral systems (ventilation, silencers, cooling, control room) installed inside or on the roof. These containerised systems also provide the added benefit of being readily transportable if power demands change. Depending on local requirements, the waste heat from the engines can also be used for heating or cooling purposes on site.

Advantages

- Generation of electricity combined with the simultaneous disposal of a problem gas
- Use of waste by-product of the crude oil production process instead of diesel fuel to avoid costs for fuel transportation over long distances
- Independent, on-site power supply
- High profitability with overall efficiency of up to 90%, in the case of combined heat and power, and up to 44% in the case of power generation only
- Smooth operation despite fluctuations in composition and impurities (within given limits) in the gas
- Depending on gas composition, full output of the corresponding natural gas engine version
- Avoidance of liberation of methane into the atmosphere, which has 21 times the global warming potential of CO_2
- Maximum availability and reliability despite high or low ambient temperature
- Small footprint due to compact design (e.g. off-shore)
- Turn-key container solutions allow for fast installation and comfortable operation

Our Competence

Clarke Energy is installing a growing number of generation projects that accept APG as a fuel gas for gas engines. This coupled with our comprehensive experience of generation of stable supplies of power from challenging gases means we are well able to support your gas generation project.

The first of Jenbacher systems using flare gas were installed in Italy in 1998. Today more than 330 units, with a total electrical output of more than 450MW run on associated petroleum gas worldwide. These plants generate about 3.6 million MWh of electricity a year – enough to supply about 1.2 million European homes. Generating this amount of electrical power with flare gas allows for savings of approximately 900 million litres of diesel fuel per year.

Cliff Head, Dongara, Australia, 3 x JMS612

Waha, Tunisia, 3 x JGC312

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