

# Cogeneration



Saving money, Saving energy, Cutting carbon



## Proven technology

The demand for energy is ever growing whilst it is becoming increasingly expensive. Businesses and individuals are seeking to reduce their costs and carbon footprint.

Due to its benefits, distributed generation such as cogeneration has become very popular in the UK and throughout the world in recent years. Cogeneration or Combined Heat and Power (CHP) technology converts gas into both electricity and heat in a single process at the point of use.

Cogeneration is highly energy efficient and as well as supplying an organisation with power and heat, it can deliver a number of positive financial and environmental benefits.



ENER-G's experience in the cogeneration market dates back to 1984 when we began designing, manufacturing, installing and maintaining cogeneration systems.

We are now firmly positioned as Europe's leading supplier of cogeneration systems from 4kW<sub>e</sub> up to 10MW<sub>e</sub> and bring a wealth of knowledge and experience to all projects we undertake.

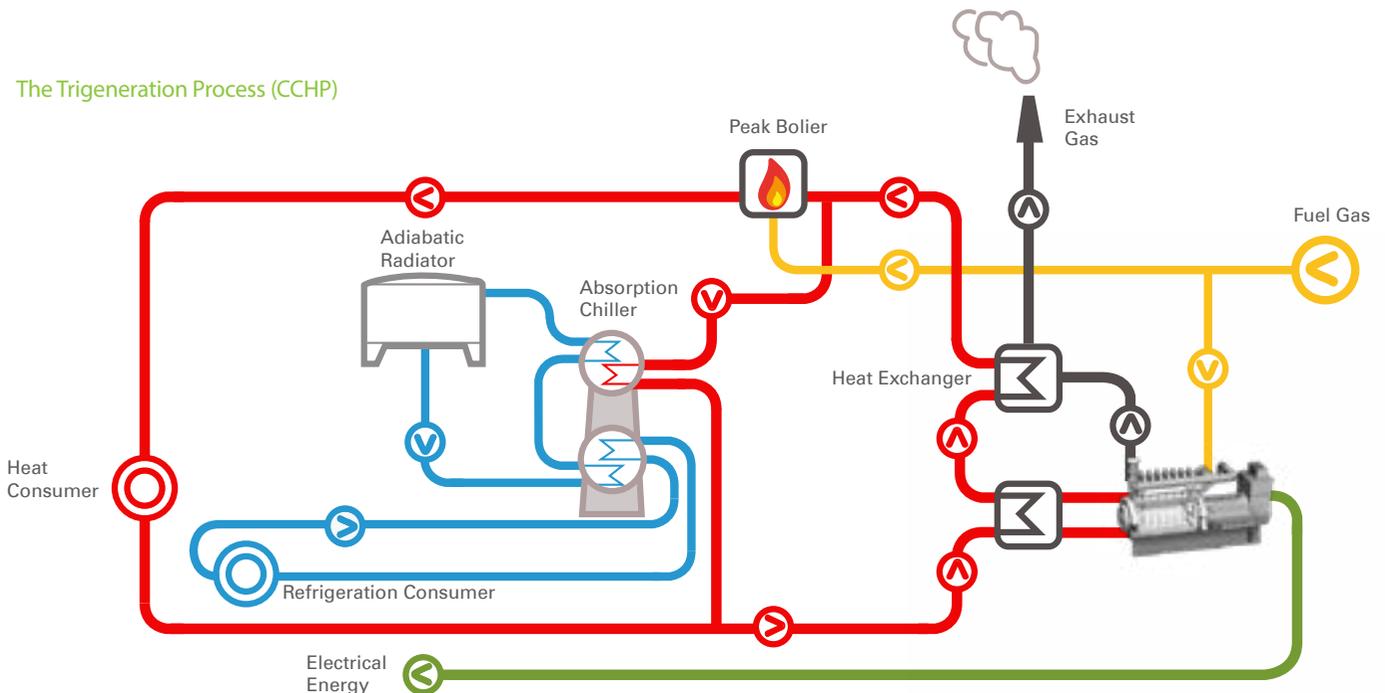


"The quality management system of ENER-G Combined Power has been approved by ISOQAR, to the standard of ISO9001:2008 including the design, manufacture and service of Combined Heat and Power units for hotels, hospitals, leisure centers and industrial applications."

### Our services include:

- Feasibility study
- System specification
- Design and build
- System testing
- Installation and commissioning
- On-going operation and maintenance
- Finance options

### The Trigereneration Process (CCHP)



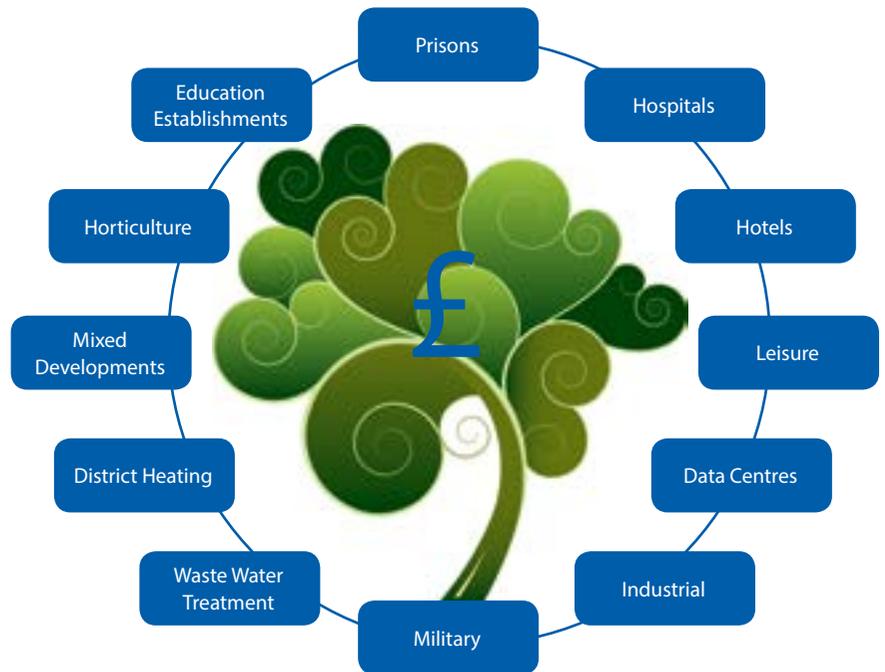
# Benefits and applications

## Ideal cogeneration applications

The technology is ideal for applications with consistent demands for thermal energy and electricity.

Cogeneration should be considered when:

- Increasing energy efficiency
- Reducing energy costs
- Designing a new building
- Installing new boiler plant
- Redeveloping an existing site
- Supporting your company's green image
- Managing existing power demands
- Improving Corporate Social Responsibility



## Cogeneration benefits

### Operational

- Reduced base load electrical supply
- Additional security of supply
- Increased diversity on heating and hot water
- Steam raising capabilities on larger units
- Choice of multiple fuels
- Cooling provision absorption chillers

### Environmental

- Reduced primary energy use
- Reduced CO<sub>2</sub> emissions
- Help with carbon legislation compliance
- Reduced transmission losses from the grid
- Lower SO<sub>x</sub> emissions with the use of natural gas as a fuel

### Financial

- Reduced primary energy costs
- Zero capital outlay option
- Stabilised electricity costs over a fixed period
- Reduced investment surrounding plant e.g. boilers
- Eligible for Enhanced Capital Allowances
- Potential ROCs eligibility (Biogas, Liquid Biofuel)
- Potential benefits from Renewable Heat Incentive
- Sufficient savings to fund energy efficient measures

### Legislative

- Helps with Part L compliance
- Helps meet the CRC Energy Efficiency Scheme (CRCEES) targets
- Helps reduce carbon footprint
- Avoids Climate Change Levy

# Your route to CHP with ENER-G



## The steps towards CHP

Understanding the process and key steps to getting a CHP and making sure it is right for you can seem difficult at times, that is why ENER-G makes it simple and straightforward.

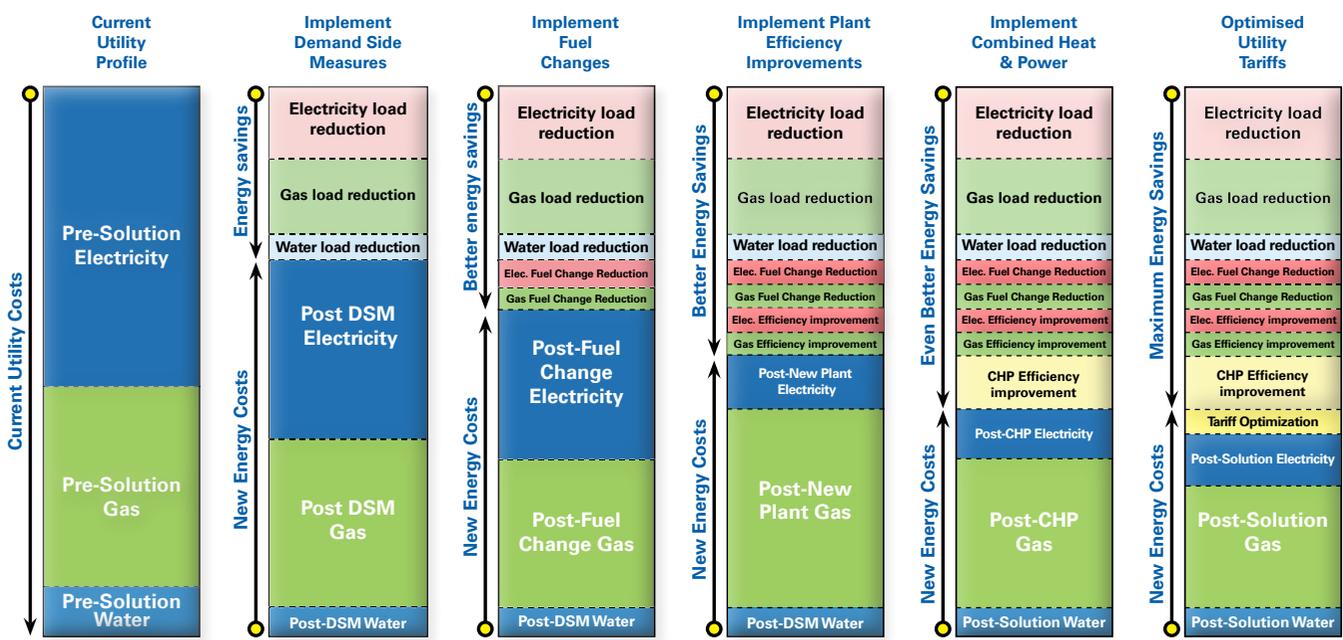
Firstly gather together current gas and electricity data and tariffs, send them into ENER-G and we will do all the analysis.

As you can see in the table below, we look at all the energy initiatives that can provide savings and use that information to ensure the optimum CHP is selected.

ENER-G then provide a free energy analysis report and a proposal of changes and measures that can help an organisation reduce their carbon footprint whilst making financial savings.

With 30 years' experience delivering CHP projects, ENER-G has the know-how to offer the optimum energy saving solution.

## ENER-G's approach to maximum energy savings



## Financial options

The long-term future of Combined Heat and Power is secured in the global energy markets, by its ability to provide a multitude of operational, environmental and financial benefits.

Now more than ever, the certainty of fixed price low cost energy gives businesses the stability they need. ENER-G can provide this key service, often at no capital cost.

Our flexible finance options can be specifically tailored to the individual requirements of each of our customers, regardless of the project size, cost or complexity.

We have an outstanding reputation of being the market leader in offering real added value financial solutions.

### Capital purchase

Capital purchase allows businesses to claim 100% first year capital allowances on investments in energy saving technologies. The scheme can be either the sole purchase of the unit or the full scope of the project including feasibility studies, project design, supply, installation and commissioning.

The fixed cost can be for a complete turnkey package or just the supply of equipment. We can also offer a service package that will operate and maintain the system throughout its life cycle.

### Energy Saving Contract (ESC)

With an ESC the client signs a contract to purchase the electricity generated by a CHP unit over a number of years. ENER-G will fund all the costs associated with the implementation of a CHP project. This means there is no capital outlay or risk for the client. It is also a faster route to scheme implementation and immediate savings with no continual maintenance/aftercare costs. ENER-G take on the full investment risk for the project. ESC customers receive the Premier Plus service package free of charge as part of the contract agreement.

### Energy Service Agreement (ESA)

Using a range of Demand Side Measures (DSM's) including Combined Heat and Power, ENER-G will guarantee annual savings to the customer's energy and operational budgets. A proportion of the savings can be "recycled" to cover the cost of implementing and operating the DSM's throughout the ESA contract term, typically 10 or 15 years. This type of contract provides customers with guaranteed savings and levels of service delivery, but with zero capital outlay. It is a solution to maintenance backlog issues and a proven method to reduce site energy consumption.



## Operation and maintenance

### ENER-G Service Centre

After investing in CHP looking after the unit and its performance is a very important part of the equation. The operation of a cogeneration engine can be compared to a car engine running at 17 hours a day, the engine runs 217,000 miles per annum.

Our Service Department at head office coordinates the deployment of our nationwide engineering team 7 days a week 365 days a year. We offer a rapid response to all incidents to ensure optimum operation, benefits, and to maximise the life span of the CHP unit.

CHP systems require regular, periodic maintenance and inspection. The unit will require a service after a predetermined amount of hours.

Units typically require between 6 and 10 services per annum dependent upon operation. The service procedures vary throughout the year from replacing and recalibrating components to oil and filter changes.

The CHP unit often uses gas as its fuel and is therefore subject to the Gas Safe Regulations.



Support and manufacturing.  
Manchester, UK.

ENER-G offer a variety of flexible maintenance packages:

#### Premier

The Premier Service package includes:

- 24 hour remote monitoring
- Automated SOS alerts
- Communication with central servers
- Remote SOS alert via SMS
- Part identification
- Remote fault diagnosis and rectification
- Safe oil disposal
- Oil Analysis programme
- Dedicated site engineer
- Routing scheduled servicing

#### Premier Plus

The Premier Plus service package includes all of the benefits associated with the Premier package, but is also inclusive of all parts and labour required to rectify faults or repairs for the contract term, within the acoustic enclosure.

The service is a fixed price paid annually for the term of the contract. To offer flexibility and the opportunity to take advantage of early savings, the price can also be profiled against the age of the system across the contract term (subject to contract). Premier Plus is the number one CHP maintenance package in the industry, covering both service and repairs, without the need to raise purchase orders and minimising operational downtime. Premier Plus is the best way to achieve the biggest savings.



### Remote monitoring and customer reports

An integral part of the CHP unit is the on-board computer. The computer's function is to provide optimised safe and efficient operation of the CHP.

The computer also provides a two-way communication channel between the CHP unit and ENER-G's Service Centre, this allows for live system operational monitoring and full historic data retrieval.

In the event of system faults ENER-G's Service Centre can receive an SOS signal from the unit, run remote diagnosis, rectify problems and schedule an engineer if necessary.

The system in place reduces operational downtime and maintains client savings, whilst generating monthly customer performance reports and offering customers the opportunity to log on and monitor operation and savings.

## Case studies

### Isaac Newton Academy

#### Key facts:

- 90kW<sub>e</sub> CHP system
- £32,000 annual savings
- 144 tonnes of carbon saved annually
- Premier Plus maintenance contract
- Key element in the academy's energy saving initiative

Isaac Newton Academy are using a technically advanced ENER-G 90kW<sub>e</sub> Combined Heat and Power unit to assert their commitment to green energy initiatives, whilst generating over £32,000 per year in energy savings.

The system reduces their carbon footprint by around 144 tonnes per annum, the equivalent to taking 48 cars off the road each year.

As a forward thinking Academy, they looked into efficient and energy savings options for the brand new building. One of the school's largest initiatives was the installation of an ENER-G 90kW<sub>e</sub> Combined Heat and Power (CHP) unit.

By using CHP to generate electricity on-site, the heat created in the electricity generation process can be recovered and used by the school can use to provide its hot water and heating requirements.

### Museum of Liverpool

The prestigious £72 million Museum of Liverpool has installed an advanced Combined Heat and Power (CHP) system, guaranteeing annual energy savings of more than £500,000.

The 'trigeneration' technology, which creates highly efficient heat, electricity and cooling, will also reduce carbon emissions by 1328 tonnes each year.

ENER-G designed and manufactured two 385kW<sub>e</sub> bio-diesel CHP units, two 768kW<sub>e</sub> natural gas CHP systems, two 850kW<sub>th</sub> boilers, an 1000kW<sub>c</sub> absorption chiller and a 998kW<sub>c</sub> conventional compression chiller which will serve all the new museum's energy needs.

The CHP system is split between a plant room in the new museum building and the historic Great Western Railway (GWR) goods shed on Liverpool's picturesque waterfront.

ENER-G has converted the goods shed into a state-of-the-art energy center with sophisticated remote monitoring and diagnostic facilities. ENER-G will also operate and maintain the plant for 17 years.

#### Key facts:

- £500,000 guaranteed annual savings
- 1,328 tonnes of carbon saved annually
- Can operate without grid supply
- Operation & maintenance for 17 years
- Turnkey energy centre includes:
  - 2x 768kW<sub>e</sub> CHP systems
  - 2x 850kW<sub>th</sub> boilers
  - 1x 1000kW<sub>c</sub> chiller



## The ENER-G Cogen International

ENER-G Cogen International (ECI), a Centrica company, delivers sustainable energy solutions and technologies on a business-to-business basis worldwide. Established in Salford, Greater Manchester in the 1980's, the company offers complete solutions for all commercial and industrial energy requirements, ranging from the efficient generation of energy, to the management and control of consumption.

ENER-G designs, manufactures, operates, maintains and finances cogeneration systems from 10kW<sub>e</sub> up to 10MW<sub>e</sub> fuelled by natural gas, biogas or propane. Additionally we provide integrated energy projects including technologies such as solar, PV, clean room technology and HVAC controls. Our standby and rental fleet can also offer alternative power options. With the increasing demand for power, we are leading the way with on-demand power generation projects.

ENER-G is 100% dedicated to the development of its products and markets to achieve a strong global presence within the energy industry. Currently ENER-G operates in the UK, the Netherlands, Hungary, Italy, the USA and with partners across the globe.



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