



**CORPORATE
ENERGY AND
RENEWABLES**

COMMITTED TO EXCELLENT DELIVERY



**COMBINED HEAT &
POWER (CHP)**

COMBINED HEAT AND POWER (CHP)

What if you could generate your own electricity, capture the free heat generated and use it to reduce your energy bills while at the same time reduce your carbon emissions and footprint?

You can realise and enjoy all the above benefits when you install a CHP System within your premises.

Corporate Utilities along with our partners can Design, Supply, Install and Maintain your new CHP System.

We can help to deliver optimal energy, cost savings and performance within both your existing properties and future developments while at the same help to reduce your Carbon Footprint.

We can offer the CHP through a “Fully funded CAPEX” finance solutions, or “Direct Purchase”.

WHAT IS COMBINED HEAT AND POWER (CHP)?

Combined Heat and Power (CHP) is a well-established technology, but one that is constantly evolving to keep it amongst the best energy-saving solutions available. It enables organisations to generate their own electricity on site, reducing reliance on the Grid. Additionally, through heat recovery the technology provides free sustainable heat for use across the site.

CHP is an energy efficient engine with technology that generates on-site electricity to meet your electrical demand and captures the generated heat as a by-product which can then be used to provide useful thermal energy, such as hot water. This hot water can be used to heat your premises at no additional costs.

Corporate Energy & Renewables and our partners can enable your organisation to improve performance by creating a more efficient and resilient energy estate, providing greater on-site efficiency and delivering financial, operational, and environmental benefits.



BENEFITS OF CHP

- CHP engines are almost twice as efficient as traditional generation
- Generate electricity at around 40% cheaper than UK suppliers prices
- Utilise captured heat on-site for critical operations and processes
- Assists with BREEAM assessment, Part L of building regulations
- Meet CSR targets whilst reducing CO₂ and NO_x emissions

HOW IT WORKS

By converting a single fuel (Gas) into both electricity and heat in a single process at the point of use, the CHP engine can help your organisation improve your operational efficiency and strengthen the resilience of your site's energy.

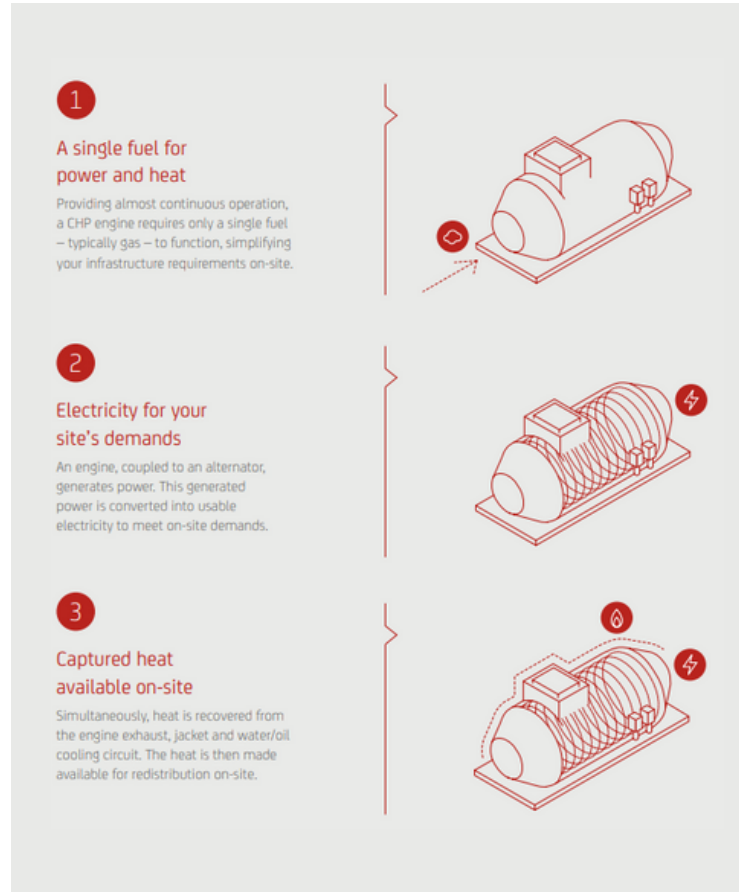
For electricity production, the engine is coupled to an alternator which generates power, which is then converted into usable electricity to meet on-site energy demands.

For heat recovery, the CHP engine simultaneously recovers the heat from the engine exhaust. The heat is then made available for redistribution on-site for heating or hot water.

Alternatively, an "Absorption cooling systems (tri-generation systems)", can be installed. Absorption cooling is a technology that allows cooling to be produced from waste heat rather than traditional methods such as a vapour condensing chiller that uses electricity.

Some sites that consider using this method will have a large continuous cooling demand, for example air-conditioning, process cooling, cold rooms, or refrigeration.

Typically, these systems require a system temperature of 6°C–12°C which is particularly suitable for absorption chillers. Absorption chillers can also be successfully incorporated into schemes that have a large electrical demand but may only have a relatively small thermal demand.



FUEL OPTIONS

The most common fuel option for CHP is natural gas. This is widely available through the mains gas network and offers straightforward and sustainable access to Combined Heat and Power. Alternatives to natural gas include biogases, bioliquids and biofuels.

CHP SHOULD ALWAYS BE CONSIDERED WHEN:

- ✓ Designing a new building
- ✓ Installing or replacing a new boiler
- ✓ Replacing or refurbishing existing plant
- ✓ Reviewing electricity supply / consumption / costs
- ✓ Reviewing standby electricity generation or plant
- ✓ Considering energy efficiency in general
- ✓ Reducing CO₂ emissions and environmental impact

The lifespan of a typical CHP system is 10-15 years.

COMBINED HEAT AND POWER APPLICATIONS

- Hotels
- Offices
- Residential Developments – District Heating
- Manufacturing / Factories / Warehouses
- Leisure Centres
- Hospitals
- Universities
- Commercial premises
- Horticulture
- Airports
- Pharmaceutical
- Agriculture

Our CHP solutions enable you to maximise your savings according to the size of your site load.



OPERATIONAL COST SAVINGS (OCS) BENEFITS

By installing CHP into your existing premises or into a new development, the Operational Running Costs shall be greatly reduced.

The following gives examples of the financial savings to be realised.

FINANCIAL BENEFITS

- By using CHP to generate your site electricity, you can realise combined electricity and gas utility savings of up to 40% per annum.
- Reduced site running costs.
- Claimable Enhanced Capital Allowances.
- Avoidance of Climate Change Levy. The (CCL) can be claimed back on the electricity generated by the CHP unit, also the (CCL) can be claimed back on the fuel consumed by the CHP unit.
- Fully Fixed gas tariffs shall be procured for durations of up to 5 years, giving cost and budget certainty.
- Heat generated by the CHP is provided without charge.
- Customers benefit from day 1, by having discounted electricity.

BENEFITS OF CHP

- CHP is designed to give you the power to control your energy, including improved reliability of supply, reduced costs and a lower carbon footprint.
- Reduces your dependency on the grid.
- Can be used to provide electricity if the grid supply fails.
- Cuts your site's energy costs, enabling you to divert your energy budget elsewhere
- Stabilises energy costs, allowing you to forecast more effectively.
- Utilise captured heat for on-site for operations and processes.
- CHP acts as back-up generator.
- CHP acts as a back-up heat supply.
- CHP Monitors operational assets to check the existing equipment is running as it should and is not wasting energy and use this information to establish baseline energy consumptions.
- Ongoing monitoring and Maintenance ensure that energy reduction measures are monitored and report on improved on site efficiency. Ensure continuous operation through regular maintenance.

**2-4
years**

payback is
achieved on
equipment in 2-4
years

**15
years**

equipment
lifespan of up to
15 years

CARBON REDUCTION / ENVIRONMENT

A CHP System can reduce both your Carbon Emissions and Footprint, it also contributes to your organisation's C.S.R. targets. Should you take the Fully Funded Capex Offer, the monetary savings you start to receive from day "1" can additionally be used to initiate other environmental schemes which you may also be considering.

Your goals and targets of achieving carbon reductions, can be achieved without any financial strain on your organisation. The following gives examples of Environmental benefits from CHP.

ENVIRONMENTAL BENEFITS

- Can help to reduce CO₂ emissions by up to 87%
- Can help to reduce NOx emissions.
- Helps to meet Corporate & Social Responsibility (CSR) targets.
- Legislative compliance with part L2 of building regulations.
- Assists with BREEAM assessment, legislative compliance with Part L of building regulations.
- Helps New Construction Projects meet Carbon Legislation Compliance. Carbon legislation compliance in construction is greatly helped by CHP systems thanks to the energy savings and environmental benefits of the systems.

- Reduces Transmission Losses from the Grid. CHP systems help to reduce loss from the grid supply route (by as much as >35%) by providing a regular and consistent supply of power close to source of use.
- Combined Heat and Power (CHP) is increasingly recognised for its environmental and economic benefits. From one single on-site process, CHP can be used to provide a building with electricity and thermal energy for hot water, and space heating and/or cooling. It is around 30% more energy-efficient than conventional power from the grid and heat from gas boilers.

SUSTAINABILITY

Combined Heat and Power in action is a sustainable, efficient, cost-effective, low carbon and, above all, resilient source of energy. It converts a single fuel into power and heat simultaneously, right on your own site.

- A highly efficient technology, by using waste heat, CHP plants can reach efficiency ratings in excess of 80%.
- Assist with regulations and legislation, from BREEAM assessment to Part L of building regulations.
- Utilise captured heat, on-site for critical operations and processes.
- Lower your electricity costs and reduce reliance on grid energy by generating your own electricity onsite.
- Gain budget stability through predictable electricity costs and accurate forecasting of operating expenses.

FINANCING

We can offer a range of purchase options available to suit your organisation's budgets and goals.

You can finance your CHP System through the following 2 number of options.

1 - FULLY FUNDED CAPEX SCHEME - DISCOUNT ENERGY PURCHASE (DEP)

- Fully funded – no risk financing
- DEP is a low risk form of energy supply contract
- We fund, supply, install, operate and maintain the equipment.
- Fixed p/kwh unit rate (with indexation) for the electricity generated across the lifetime of the asset, with unit rates set below the prevailing grid rates after accounting for increased gas consumption costs.
- Heat generated by the CHP is provided without charge.
- Customers benefits from day 1 by having discounted electricity.
- A route to the benefits of CHP operation without the need to invest capital funds
- Flexibility – the customer remains free to select their own gas and electricity suppliers. We shall procure favourable rates from their preferred suppliers.

2 - CAPITAL PURCHASE

- All the benefits directly to the customer.
- All savings generated can be used to invest elsewhere in the business.
- Payback typically 2-3 years.
- Full operation and maintenance contracts available.
- Still eligible for incentives e.g. CHPQA.
- Remote monitoring to ensure optimised operation.
- Freedom to source finance or use internal funds.
- Align spending with budget cycle.
- Flexibility – the customer remains free to select their own gas and electricity suppliers.
- We can procure favourable rates from their preferred suppliers.



WORKING WITH CORPORATE ENERGY & RENEWABLES AND OUR PARTNERS BRINGS YOU EXPERTISE TO DELIVER CHP

- Our partners have over 30 years' experience as a global pioneer of modern CHP technology.
- We offer end-to-end solution development, installation and ongoing maintenance.
- Largest fleet of operation and maintenance technicians in the UK.
- Our Partners have manufactured over 800MW of CHP across the globe that they continue to operate and maintain.
- We measure and monitor over 200 Parameters on every CHP system.
- Proven track record for inclusion of CHP units in UK Capacity Market.



SERVICE CENTRE / MAINTENANCE

To maximise the longevity of your CHP, our operations department co-ordinates the deployment of our nationwide engineering team 7 days a week 363 days a year, offering rapid response.

REMOTE MONITORING

An integral part of the system is the control system, developed by our partners in-house, specifically for CHP requirements. Remote monitoring reduces operational downtime whilst collecting the data to formulate monthly performance reports.

The Progressive E-Power system also offers customers the opportunity to log on and monitor operation and savings.

CASE STUDIES

1. ST GEORGE'S HOSPITAL SOUTH WEST LONDON REPLACING AGEING ENERGY INFRASTRUCTURE

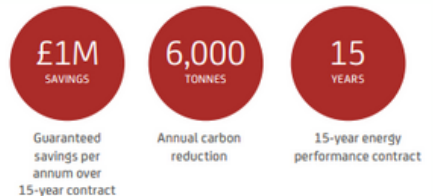
St George's University Hospitals NHS Foundation Trust is the largest healthcare provider in South West London. The location had been served by a 40-year-old energy centre which has grown increasingly inefficient, and incapable of meeting new environmental targets.

A new energy strategy for the hospital as part of a 15-year Energy Performance Contract (EPC) was developed. The contract included the installation of two Combined Heat and Power (CHP) units and four boilers, which form the energy centre.

During the work on the energy centre, it was crucial that the boiler house remained operational as the steam generated by the boilers is used to generate heat and hot water for the rest of the hospital. The installation was carried out without any impact on the hospital and its patients.

THE RESULTS

- The Trust is guaranteed to save more than £1m a year during the 15-year contract, which is a total of £15m for the contract duration.
- 6,000 tonnes of carbon a year will be saved each year, which is a total of 90,000 tonnes for the contract duration.
- The environmental savings help the Trust meet regulatory compliance, and act as a benchmark to other healthcare providers.



By saving £1m annually for the next 15 years, the contract will go a long way to help us maximise the resources we can put into patient care. It also massively cuts our carbon emissions and improves our overall sustainability."

Kevin Howell, Director of Estates and Facilities,
St George's University Hospitals NHS Foundation Trust

CASE STUDIES

2. ONE OF EUROPE'S LARGEST BAKERY

Producing more than two million products every day, this UK bakery places great emphasis on sustainability. When it started making plans to open one of Europe's largest plants, it wanted to ensure the bakery operated in the most energy efficient manner possible.

A 1MWe Combined Heat and Power (CHP) unit from the latest range of the most electrically efficient units was installed.

Through this installation, electricity is produced at low-voltage, then increased to a high-voltage for connection to the site's 11KV ring main.

Exhaust gases from the engine are used to generate the site's base steam load requirements, and hot water is recovered from the engine, stored, then re-used by other equipment on the site.

A ten-year maintenance contract is in place to ensure the CHP unit continues to run efficiently.

THE RESULTS

- The Bakery is saving a minimum of more than £400,000 each year. Over a 10-year duration this equates to £4m in savings.
- The CHP unit is helping the new plant to save 1,000 tonnes of carbon emissions annually, which is a total of 10,000 tonnes over a 10-year period.



CASE STUDIES

3. LEADING UK RETAILER DISTRIBUTION CENTRE REDUCING ENERGY COSTS, 'GREENING' THE SUPPLY CHAIN

This customer is one of the UK's largest supermarket retailers, with stores and warehousing nationwide. The business has a dual focus on energy: it wants to be smarter in the way it generates and consumes energy in order to reduce costs and must meet strict new government regulations around carbon reduction.

The retailer's warehouses are huge spaces and tend to be energy inefficient, the business is also tasked with 'greening' its supply chain.

An innovative, multi-faceted solution for one of the retailer's largest UK warehouses was developed. The main component is a containerised ENER-G 1.5MWe Combined Heat and Power (CHP) unit, with an MTU genset. The hot water from the MTU units will be used to supply all on-site water, and power the heating systems. In addition to the CHP a special Exhaust Gas Heat Exchanger has been designed for this application. This will drive the ammonia chiller to produce -32 degrees chilled water, keeping the distribution warehouse cool.



THE RESULTS

- The Energy Solutions products will deliver the necessary savings on energy and cost, and help the retailer meet its carbon reduction commitments.
- The current modelling estimates annual cost savings of £400,000, with 11,637MWh displaced from the grid.
- The solution is expected to save 5,775 tonnes of CO2 annually.
- The approach provides a blueprint for the retailer's other warehouse locations in the UK.



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CONTACT US

ENGLAND OFFICE

70 GRACECHURCH STREET, LONDON, EC3V 0HR

SCOTLAND OFFICE

BANTON MILL, MILL ROAD, BANTON, GLASGOW, G65 0QG

0207 118 1814

0333 800 1878

info@corporateenergy.co.uk

www.corporateenergy.co.uk

