



Pureenergy

Combined Heat and Power

about Cogenco

Cogenco Limited has over 20 years experience in Combined Heat and Power (also known as Cogeneration) and is firmly established in the market place as the developer of today's leading CHP products.

During this time our range of CHP units has been developed in conjunction with the world's leading engine manufacturers.

Our units operate on a variety of fuels including natural gas, renewable biogas, biomass, biodiesel, and landfill gas, and range from under 100kWe to 2MWe.

In addition we offer all our customers a complete package: in-house design and development, assembly, factory testing, commissioning, installation and project management, comprehensive maintenance, technical advice and support.

Our design, assembly, test and remote monitoring centre is located at our Head Office in Horsham, West Sussex, UK.

Cogenco has installations in the UK, Europe and throughout the world.



what is Combined Heat and Power? The Low Carbon Technology

As the concern about global warming continues to grow, there is a very real need for decentralised generation technologies that can reduce carbon emissions.

By making the best possible use of either fossil or renewable fuels Combined Heat and Power systems (CHP) provide the single most efficient way to reduce carbon emissions and cut energy costs.

CHP works by using the chosen fuel to produce both electricity and heat at the same time and deliver them at the point of use.

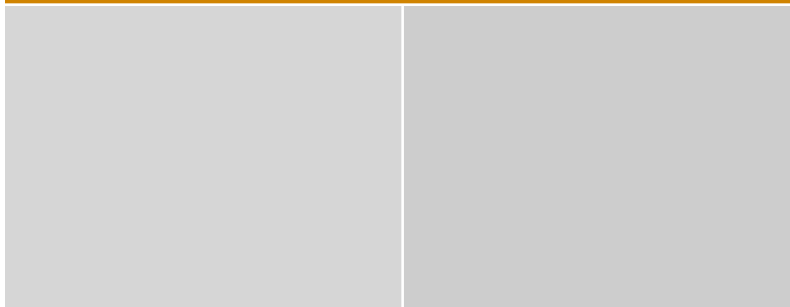
Rather than wasting the heat rejected by the electrical generation process, CHP recovers most of it, normally in the form of hot water, which increases the efficiency of fuel utilisation. A typical unit will have a heat output of around 1.5 times the electrical power output – energy that would normally just escape to the atmosphere.

As well as their high energy efficiency and low carbon emissions – especially when using sustainable or renewable fuels – CHP installations offer other practical benefits too:

- Efficient energy utilisation means lower energy costs
- The CHP units can use a wide range of conventional and green fuels
- The CHP units provide three-phase AC power at either 50 or 60 Hz depending on local requirements
- Electrical output is normally synchronised to the mains supply – with island operation available as an option
- Chilled water can also be produced by supplying heat from the CHP unit to an absorption chiller.



CHP is the single most effective way to reduce carbon footprint



Top marks for Cogenco

The University of Warwick is making the most of Combined Heat and Power on its campus. Four Cogenco units are in operation and have reduced energy site consumption and CO₂ by 30% per annum. The units run 24 hours a day and excess heat from the units is passed to an absorption chiller to provide air conditioning for the University.

how does CHP work?

A CHP plant typically consists of an engine driving a 3 phase electrical alternator.

Heat exchangers recover the heat energy that would normally be lost in engine exhaust gas and engine cooling water to provide hot water. This makes CHP much more energy efficient than traditional heat and power solutions and has the double benefit of reduced operating costs and CO₂ emissions.

Sankey diagram:

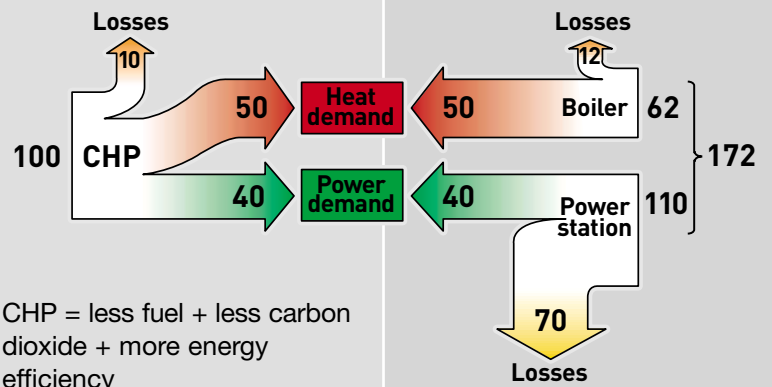
The diagram shows the energy distribution per unit quantity of fuel to a CHP versus conventional boiler and mains supplied electricity.

CHP

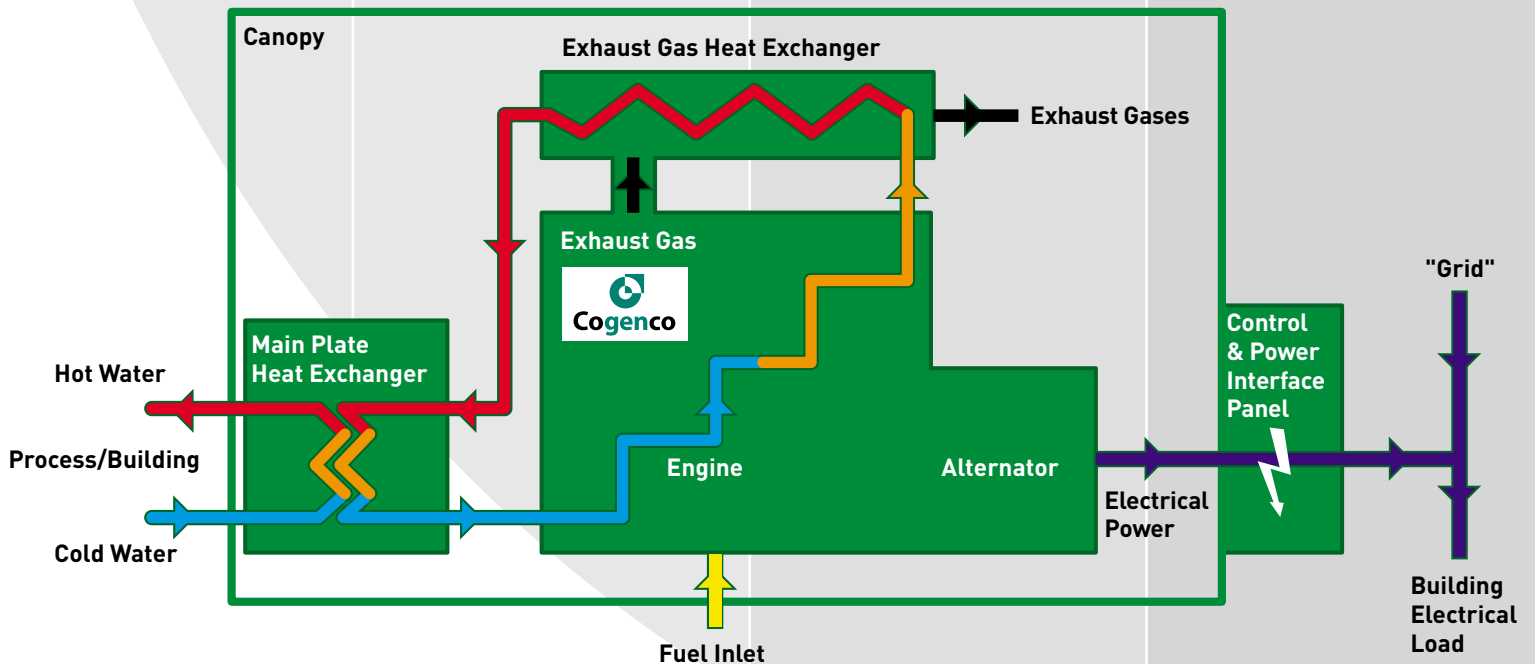
Overall efficiency 90%

Conventional Methods

Overall efficiency 52%



CHP = less fuel + less carbon dioxide + more energy efficiency



what is trigeneration?

Trigeneration is a combination of cogeneration and absorption chilling. The process of cogeneration produces heat and power, however during the summer months the heat generated may not be fully utilised on site.

It is during this time that the demand for cooling often reaches its maximum. The solution is to use the excess heat to operate an absorption chiller.

Absorption chillers are very compact and with only a few mechanical parts, maintenance is therefore kept to a minimum.

Energy savings

In comparison to conventional air conditioning methods an absorption chiller uses a waste product and therefore leads to considerable savings in primary energy consumption.

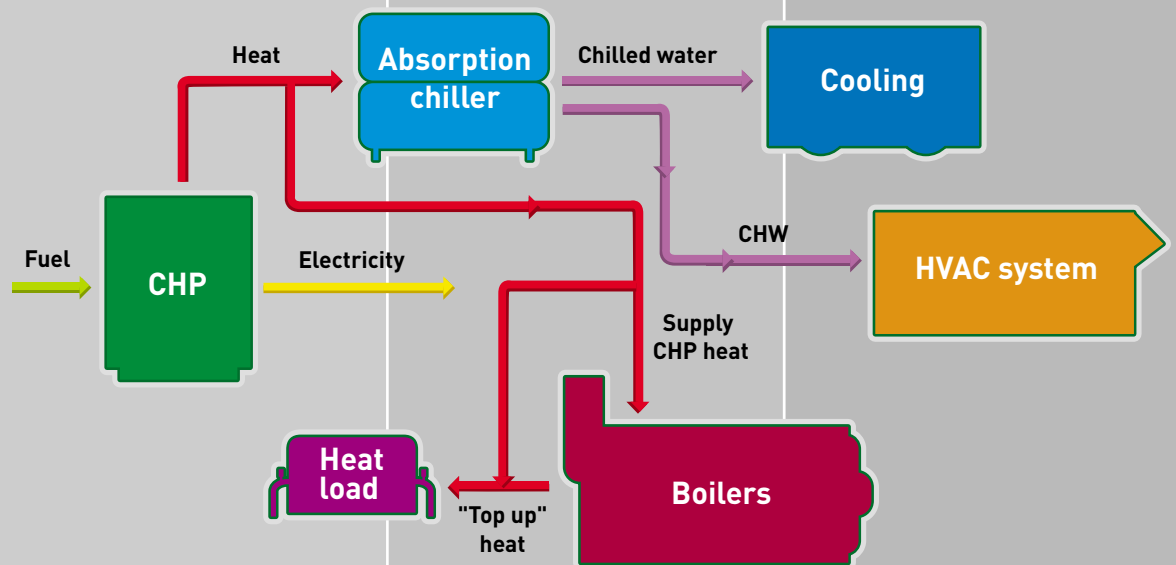
The use of an absorption chiller can reduce site electrical consumption and hence UK CO₂ emissions

Key Benefits

- Reduction in conventional refrigerant gas usage
- Maximum utilisation of heat
- Reduced chiller life cycle costs
- Environmentally friendly



Trigeneration



Cogenco checks out at Tesco

Leading UK retailer Tesco is benefiting from reduced energy costs and CO₂ emissions as part of their energy saving strategy having installed Cogenco combined heat and power units. Tesco is committed to reducing consumption in all their buildings. In addition the Tesco units have absorption chillers to provide air conditioning.

environmental and financial benefits

It is now widely recognised that increased levels of CO₂ in the atmosphere are directly contributing to climate change through global warming.

In accordance with the Kyoto Agreement, many countries in the developed world have set targets for the reduction of CO₂ emissions.

Greater use of CHP is contributing significantly to protecting the environment by reducing CO₂ emissions. For example, a Cogenco 725kWe unit fuelled by standard natural gas shows an annual saving of 1500 tonnes of CO₂

over conventional electricity generation and heat supplied from gas-fired boilers.

Carbon reduction in buildings

The legislative climate is also pushing towards ever more energy efficient buildings, with consequently lower carbon “footprints”. Many of the requirements of the European Union’s Energy Performance of Buildings directive have already been written into UK legislation (Part L Building Regulations 2006) – and more will follow. It is already the case that in order to gain planning



permission building developments demonstrate an energy efficiency increase and CO₂ reduction. CHP offers the immediate opportunity to mitigate the carbon impact of any development and reduce energy consumption.

Direct financial benefits

There is a clear economic argument for using Cogenco CHP systems, with cheaper heat and power from day one and amortisation of capital investment in as little as two years. Indeed, using Cogenco's leasing options, it is possible simply to pay for the power used without

making any capital investment – and with the cost agreed in advance you can be certain that you are saving money.

We can conduct an energy use audit and calculation of cost savings and CO₂ reduction if you switch to one of our cogeneration or tri-generation solutions.

In most cases we are able to carry out feasibility studies **FREE** of charge.



Cogenco dives in at K2

New leisure complex K2 Crawley, has had a Cogenco Combined Heat and Power unit installed to keep energy costs down and reduce CO₂ emissions. The local council is delighted with the success of the development; it has met all their expectations in design and build with the added benefit of CHP – a great success.

Please contact Cogenco to request an energy use audit and CHP savings calculation. In most cases the feasibility studies are carried out FREE of charge.

who should consider Combined Heat and Power?

There are many sectors that do and would benefit from the installation of a Combined Heat and Power unit:

- Leisure
- Industrial
- Local Authority
- Horticulture
- Healthcare
- Universities
- Retail
- Hotels
- District heating



Residential

Typical residential applications could range from medium-sized multi-occupancy developments, to hotels, large social housing developments or universities with campus accommodation.

Commercial and industrial

In the commercial sector Cogenco CHP systems are ideal for office developments, retail centres such as shopping malls and supermarkets, industrial premises and manufacturing sites.

Where there is a large amount of ambient heat generated by, for example, office computers or manufacturing plant, trigeneration – where excess CHP heat is used to drive an absorption chiller – may be the answer.

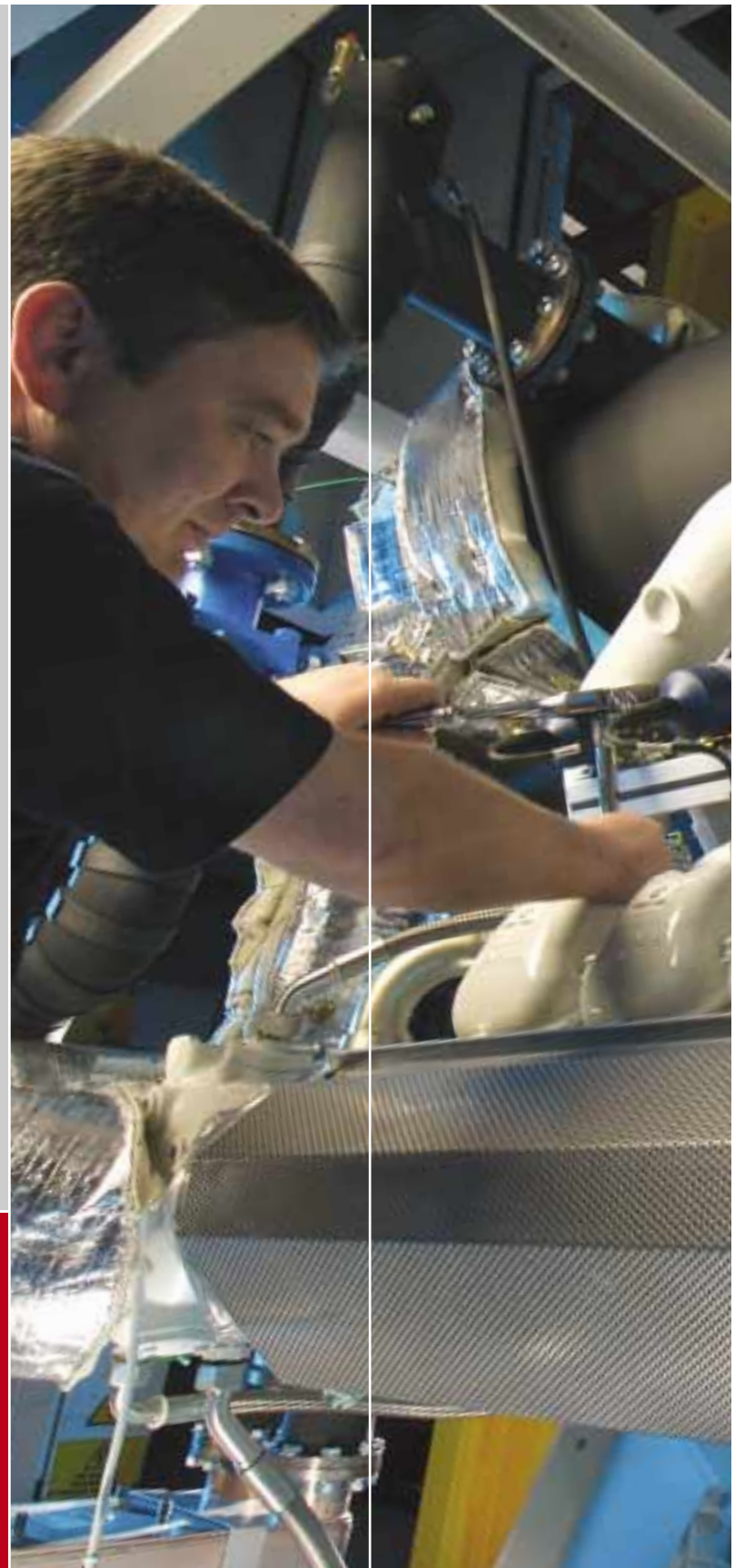
Public Sector

In the public sector, where a strong commitment to reduce carbon footprints is combined with the need for cost-effective solutions, CHP is an ideal technology for schools, hospitals and civic buildings.

Self-sufficiency

Cogenco CHP systems can just as easily run on locally produced bio-fuels as on natural gas, or stored LPG, and so can suit almost any site whatever the local infrastructure. This ability to be self-sufficient also makes CHP an effective solution for stand-by, emergency or failure-critical applications.

Cogenco can supply CHP installations to suit the majority of projects. Single units can deliver power outputs up to 2MW, while modular installations give up to 30MW. Virtually silent in operation, they can just as readily be used in healthcare, residential and office developments as in industrial applications.



Cogenco checks in at Stansted

Radisson SAS Hotel London Stansted Airport is linked to a Cogenco CHP and has saved thousands of pounds on energy costs alongside a significant reduction in CO₂ emissions. The key areas of energy cost savings, reduced CO₂ emissions, competitive pricing and excellent customer service have made a winning combination for the Hotel.

services

Cogenco's approach to CHP is not merely to supply the equipment, but also to provide a comprehensive package of support, service, maintenance and customer care throughout the complete lifetime of the installation.

Our customers can benefit from our 'cradle to grave' service that includes initial feasibility studies, design, assembly and product testing, installation and commissioning. Once the installation is fully operational we can offer remote monitoring and reporting, service and comprehensive maintenance with our own team of highly trained and experienced service and commissioning engineers.

Cogenco's CHP solutions cover a wide range of heat and power outputs for small, medium and large installations.



- *Feasibility studies*
- *In-house design*
- *Assembly and product testing*
- *Installation*
- *Commissioning*
- *Remote monitoring and reporting*
- *Comprehensive maintenance*



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Protection, control and monitoring

We operate an advanced internet-enabled, remote monitoring, protection control system, ensuring all of our CHP units maintain optimum performance at all times.

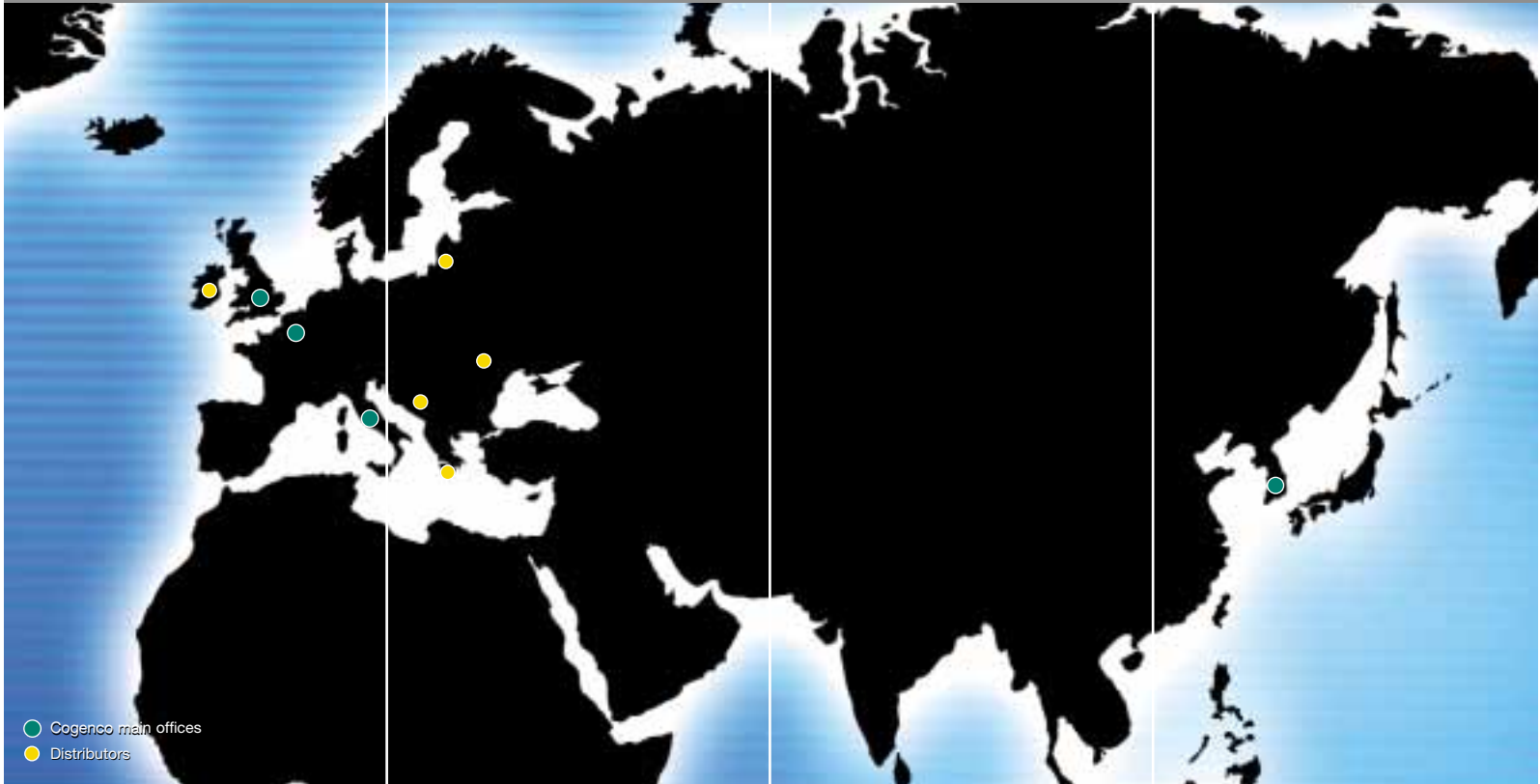
The system carries out automatic 'health checks' and makes remote interventions to achieve maximum efficiency while monitoring the condition of components to schedule preventative maintenance.

Operating data is tracked, stored and analysed to produce regular performance reports.

Local control and monitoring is via a user-friendly touch-screen computer and analogue graphical display.

The HMI (Human Machine Interface) has a range of display options including 'dashboard' style, pressure and temperature parameters, engine function and statistics, power parameters, event log and graph screens.





If you would like to know more about the economics and environmental advantages of cogeneration from Cogenco, please call +44 (0)1403 272270 to speak to one of our representatives who will be pleased to help or alternatively send us an email to info@cogenco.com

We look forward to hearing from you and discussing the potential of cogeneration in your organisation.

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