

COMBINED HEAT AND POWER PLANT AT JURYS HOTEL AND TOWERS - DUBLIN



WHAT IS CHP?

Combined heat and power (CHP) involves the production of electricity on-site so that the heat by-product from the generation process can be recovered and used for steam production or process and space heating, rather than being wasted as is the case with centralised generation.

The overall efficiency of cogeneration can be as high as 90% compared with a typical efficiency of about 35% for traditional power stations and 55% for the latest generation of combined cycle gas turbine plants.

CHP technology is well established in Ireland. There are currently some 70 installations in operation, and 20 of these generate 1 MW or more.

For energy users, the advantages include reduced electricity and fuel bills and greater security of energy supply. CHP use also benefits the environment by helping to preserve finite fossil fuel reserves and reducing the emission of energy-related pollutants.

JURYS HOTEL AND TOWERS, DUBLIN

This hotel, located in Ballsbridge, Dublin, consists of two adjoining hotel blocks. The main hotel comprises 300 bedrooms, function rooms, restaurants, lounges, pubs, a leisure centre with swimming pool and a business centre. The separate tower block contains a further 100 bedrooms. With a substantial year-round demand for electricity and heat, this hotel is an ideal location for the installation of a Combined Heat and Power unit.

BACKGROUND

Prior to the installation of the CHP plant, the heating services for the hotel were provided by two ageing steam boilers, each rated at 4765 kg/h. Motivated by concerns over low efficiencies and increasing unreliability, Jurys commissioned Inenco Energy to undertake an extensive review of the situation and make energy efficiency recommendations.

THE PROJECT

Inenco recommended the installation of a 300kW CHP plant, and the replacement of the existing steam boilers with two 1400kg/h boilers for the laundry and two 220kW low pressure hot water boilers.

The CHP unit chosen was supplied by Temp Technology. The plant is integrated into the hot water system, with hot water being circulated via the CHP unit in the primary water loop before returning to the boilers. Therefore, the boilers are only required to supply the make-up heat for raising water to the desired temperature (90°C).

Due to the nature of the hotel's business, there was a critical requirement for very low noise and vibration levels from the CHP unit and for interruption-free installation. For this reason, the unit is surrounded by an acoustic enclosure (80dBA@1m) and anti-vibration mountings.



CHP Enclosure

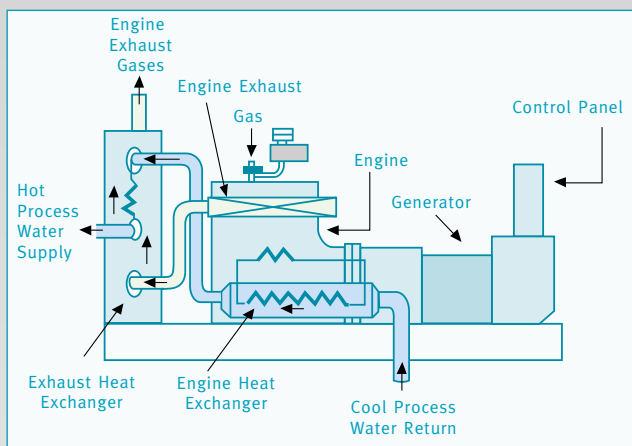


CHP TECHNICAL DATA

Type	Dorman 6DTg
Electrical Power	304kW (30%)
Heat Output	445kW (45%)
Fuel Input	999kW

The total useful energy conversion efficiency of 75% in normal operation compares favourably with efficiencies of approximately 35% at large power stations.

SCHEMATIC OF A TYPICAL CHP ENGINE



INSTALLATION

The entire installation and redevelopment project took place over a period of 10 months. During this time the hotel remained fully operational and suffered little or no disruption. This was achieved with some of the change-over work being carried out overnight.

PLANT OPERATION

The CHP plant operates for 15 hours per day during the higher, day electricity charge period, i.e., between 8am and 11pm every day, 365 days of the year. Based on a CHP availability of 93% on average, net operating hours are estimated at just over 5090 hours per annum. Routine servicing and maintenance of the unit is carried out within this 7% annual downtime.

MAINTENANCE

Temp Technology carries out all the maintenance of the CHP unit. The cost of the maintenance contract is based on a charge per kWh produced by the unit.



Inside of CHP Enclosure

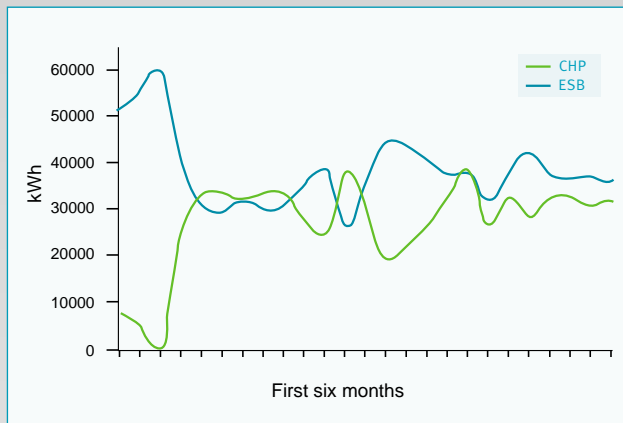
The unit is equipped with an on-board computer which allows continuous monitoring of the unit by Temp Technology via a modem. This monitoring system can, in many cases, allow possible faults to be dealt with before a breakdown occurs. Monthly performance of the CHP unit can be downloaded and reported to the customer.

Routine maintenance is carried out every 800 hours and would include replacement of oil and filters, examination/replacement of spark plugs and analysis of engine performance and oil quality.

ENERGY SAVINGS

Before this project was undertaken, Jurys Hotel was spending over IR£300,000 per year on energy (electricity, oil and natural gas). The installation of the CHP unit has resulted in total annual savings in the region of IR£50,000. With an installation cost of approximately IR£190,000, this gives a simple pay-back period of 3.8 years and a grant from the Irish Energy Centre further reduced this period to approximately 3 years.

CHP USE Vs ESB USE



ENVIRONMENTAL CONSIDERATIONS

By using fossil fuels more efficiently, CHP reduces the environmental impact associated with heat and power production.

Carbon dioxide, the main greenhouse gas implicated as a cause of global climate change, is released whenever fossil fuels are burned. Ireland has agreed to control emissions of this and other greenhouse gases under the Kyoto Protocol on Climate Change.

Compared with traditional heat and power production, every 1 MW of CHP installed prevents 1250 tonnes of carbon dioxide being emitted to the atmosphere every year, helping Ireland to meet its international commitments to stabilise greenhouse gas emissions.

CHP also reduces the emission of sulphur and nitrogen oxides, which contribute to acid rain and acidification, and it helps to preserve finite fossil fuel reserves.

So the installation of cogeneration plant not only provides direct financial benefits, it also allows developers and owners of new or existing commercial buildings to demonstrate their commitment to sustainable development.

CONCLUSION

This type of CHP installation has potential for replication in commercial, office or mixed commercial and residential developments.

For further information on CHP in Ireland, and other energy saving technologies and initiatives, contact:



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