

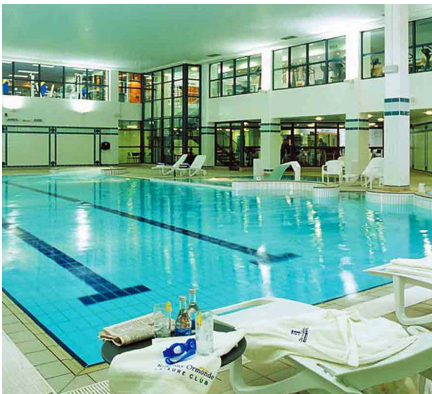


Case Study

A new Combined Heat and Power unit reduces operating costs and emissions for the Kilkenny Ormonde Hotel



KILKENNY ORMONDE
hotel



Located in Kilkenny City, The Kilkenny Ormonde Hotel offers 118 guest bedrooms, with leisure centre facilities, swimming pool, meeting rooms and conference venue.

This hotel invested in Combined Heat and Power (CHP) technology 16 years ago to reduce operating costs and has recently upgraded this unit.

In 2016 the Kilkenny Ormonde Hotel upgraded its CHP unit to more precisely reflect the heating and electrical requirements of the hotel and leisure centre. The water heating system had previously been adjusted to take energy from the CHP.

Having past experience of the savings that CHP technology offers, the plan was to invest in a more appropriately sized unit that would have a longer uptime and therefore generate further efficiencies and financial savings.

The unit was supplied within a containerised package and placed on the roof to reduce noise. Previously, the CHP unit was located on the bottom floor of the hotel in the boiler room. With 16 years of running data available to analyse, the newer unit was sized more efficiently, allowing the hotel to utilize the electricity produced to be used in the leisure centre. This had not been previously possible.

Results

Annual energy saving of circa €47,000

Payback on investment in less than 3 years

Uptime increase of 25% since installation

Projected average of 5,475 operating hours per annum

CO₂ reduction of 312 tonnes per annum

Additional benefits include reduced maintenance and carbon tax

The CHP unit satisfies:
65% of the total heat demands
40% of the total electrical demands



CHP unit



Natural gas boiler



Hot water storage tanks

What is CHP?

CHP, also known as “Co-Generation”, is the simultaneous production of electricity and heat, usually in the form of hot water or steam from a primary fuel such as natural gas (see figure 1). Electricity is generated on site by using natural gas to drive an alternator connected to the engine. The heat from exhaust fumes generated by the engine is harvested to provide heating and hot water to the hotel and leisure centre, while some of the energy within the hot water can also be used to provide cooling and air conditioning by using absorption chillers.

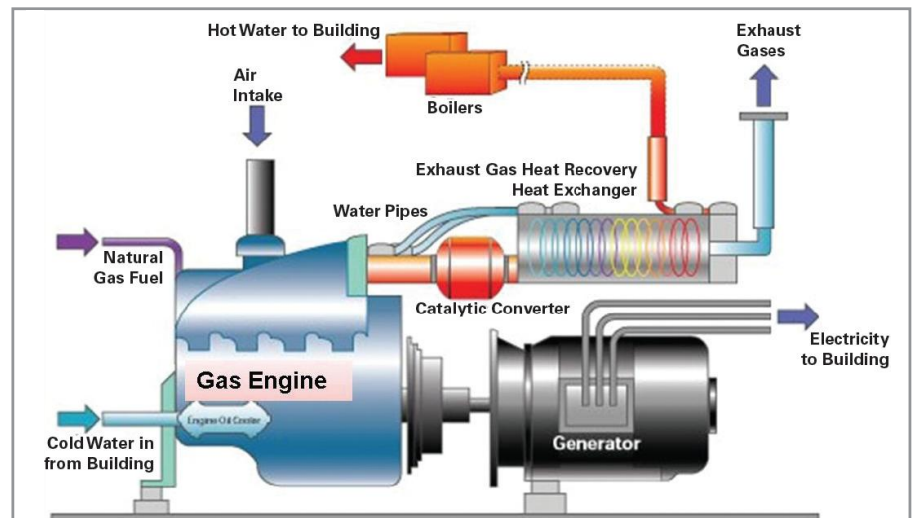


Figure 1. Inside a Combined Heat and Power Unit

Why CHP?

Due to potential inefficiencies in electricity generation and the resulting cost of electricity from energy suppliers, significant savings can be made by generating electricity to meet requirements on your own site. The financial benefits of onsite electricity generation (using natural gas to power the electricity generator) are evident by comparing daytime electricity prices in Ireland of circa 12.34 cent/kWh with market natural gas prices of 4.08 cent/kWh (SEAI, April 2016 including VAT and relevant taxes).

Description of Plant Energy Facilities

There is one main boiler-house on site with total boiler output of 2.6MW.

There are four boilers on-site however, only two are ever running at one time.

The CHP is used to heat the water for the leisure centre to 60°C. This heated water is then moved from the the leisure centre to hot water storage tanks at the hotel, where it is kept at adequate temperature until required.

During the day from 8am to 11pm the CHP unit is operational while at night the heated water from the storage tanks is used to keep the temperature constant. The whole process is controlled automatically by a computer system monitoring the usage conditions.

Benefits of Natural Gas Over Oil

Fuel cost has decreased by circa €47,000 per year

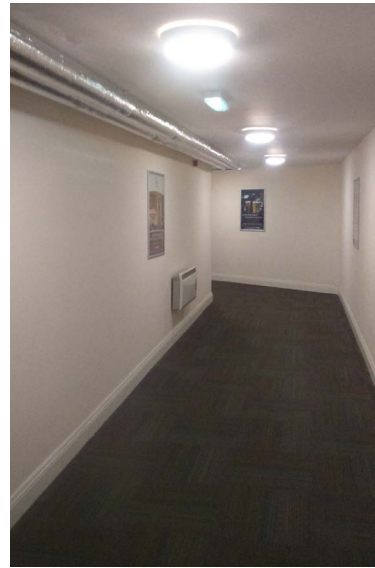
Carbon emissions are reduced by 312 tons annually

Increased up time has ensured a reduction in maintenance

Reduction in noise pollution



CHP unit



Pipes running from leisure centre to hotel



Old CHP unit

Kilkenny Ormonde Hotel Technical Details:

Equipment

Temp Technology designed the new energy system and oversaw the entire project. All equipment used was supplied, installed and commissioned by Temp Technology. The CHP system installed was the ENER-G100 generating 100kWh of electricity and 174 kWh of heat.

Objectives

This newer CHP unit was installed to increase the overall runtime to ensure a better overall efficiency and therefore more electrical output for free. Due to its low cost and greater efficiency, natural gas was chosen to fuel the unit once again.

In 2012 the water heating system had previously been adjusted to take energy from the CHP with pipes running from the leisure centre to the hotel. With the new CHP unit the hotel management wanted to make full use of this increase in efficiency, making greater use of the free energy available from the CHP.

Noise Reduction

The unit was supplied within a containerised package acoustically treated to comply with site conditions of 65dBA at 1 metre. With the new containerised unit and its placement on the roof there is less noise from the system and the added space makes it easier to access and maintain. All necessary controllers, cooling fans, exhausts etc. were all housed within this package and delivered on-site.

Increase in Uptime

As the CHP unit is now sized correctly for the requirements, it is more efficient, running for longer and can provide more of the heating and electrical loads. The unit runs almost 100% efficient.

Emission Reduction

Reduction in carbon emissions has meant a decrease in Carbon Tax credits of between €3,500 - €4000 per year.

Maintenance Costs Reduction

The longer running times has ensured savings on maintenance of €5000-€6000 approximately with the newer CHP compared to the previous unit.

Kilkenny Ormonde Hotel Details:

Comparisons

	Percentage/Numerical Values (Annually)
Payback period	3 years
Efficiency increase	25%
Cost savings per year	€47,000
Carbon reduction per year	312 tonnes

Management Perspective

“Our strategy was to invest in a more appropriately sized unit, with the knowledge and experience of the savings that could be earned. We are extremely happy with this new investment which has provided a number of benefits including on-site electricity generation, greater uptime, further efficiency gains, financial savings and fewer maintenance costs.”

Colin Aherne, General Manager



Technical Team

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This information is only a guideline in relation to the different products available for use with natural gas. Users should ensure that products are suitable for the specific circumstances in which they seek to apply them. Contact the supplier or manufacturer directly for specific information on building requirements and materials needed for installation. Professional advice specific to the project should always be sought. The current Irish Gas Standards and Technical Guidance Documents (Building Regulations) override all contents. Users should ensure they always have the most up-to-date information.