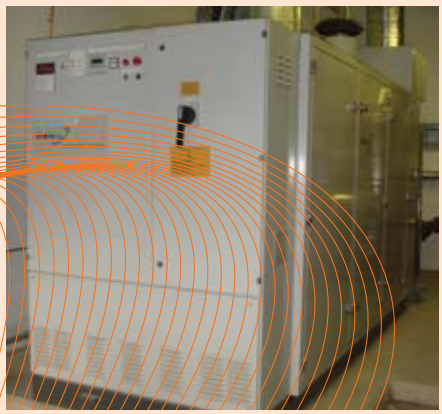
Lyrath Estate Hotel

CHP PLANT



Technology: Reciprocating gas engine CHP supplying heat, hot water and electricity to the hotel

- CHP Elec. 150 kW_e
- CHP Heat 231 kW_{th}

Location: Lyrath Estate, Co. Kilkenny

Results: Net energy cost savings of €60,000 and CO_2 savings of 250 tonnes per annum

Installation Date: March 2006

Owners Perspective

"It's fantastic – our CHP plant provides all the central lighting and hot water for the hotel. Since its installation we have optimised the systems performance and overall we're extremely happy with it. As backup for the remainder of the hotel's electricity requirements, we also decided to install a 600 kW generator. This means that along with the substantial annual cost savings we have a completely self sufficient electricity supply during ESB outages with all our electricity requirements being provided on site by a combination of the CHP plant and generator."

Billy Bradley, Maintenance Manager, Lyrath Estate.

Organisation/Company

Owned by Xavier McAuliffe, the Lyrath Estate is a two year old hotel, spa and convention centre set on 170 acres, two miles from Kilkenny City. The hotel is built around the original 17th century house and has 137 bedrooms.

Project Background

The extensive facilities provided by the hotel such as 24-hour air conditioning, seven different bars and restaurants and a leisure centre mean that the hotel's energy requirements are substantial. Both the environmental benefits and the cost benefits of installing a CHP plant were considered before the new hotel was built. Predicted energy costs were the key driver because these would be second only to staff costs as the biggest overhead for the hotel. The hotel owner engaged CHP suppliers Temp Technology, and when he was informed that the system was both proven technology and could be expected to pay for itself in less than three years he was sold on the idea. Once installed, the CHP plant would contribute to the heating, hot water and power requirements of both the hotel and its leisure centre.

Project Development

Mechanical contractor L. Lynch and Co undertook a feasibility study for the hotel on the type and size of CHP system required and the implications for the hotel's construction. Although construction of the hotel had not been completed at this time, suppliers Temp Technology had all the necessary electrical and thermal data, based on information from both the feasibility study and previous studies done for other, similar clients. The key issue that emerged from the study was the importance of sizing the system correctly. If the unit

was oversized, it would end up dumping excess heat in summer when the demand for heat drops and so the efficiency of the plant would be greatly reduced.

The planned boiler house for the hotel was large enough to accommodate the CHP plant, so no further planning permission was required. The CHP plant was located inside the boiler house alongside the traditional boilers. The project in total took approximately 3 months to complete from order to commissioning. Order to delivery took eight weeks; installation took a further three weeks, and pre-commissioning and commissioning of the system an additional ten days. The installation process as a whole was problem-free.

Plant Operation

L. Lynch and Co and Temp Technology decided to install an Ener.G 150, which is a reciprocating gas engine combined heat and power system. Its physical size is 3.5 metres long by 1.4 metres wide by 1.94 metres high. The plant is rated at 427 kW input, burning natural gas, to produce 150 kW of electricity and 231 kW of heat output. At present, the CHP plant is in operation from 8am to 11pm.

Energy Requirement	Energy Source
Daytime Heat	CHP 60%, Natural Gas Boilers 40%
Daytime Electricity	CHP 50%, External Electricity Provider 50%
Night time Heat	Natural Gas Boilers 100%
Night time Electricity	External Electricity Provider 100%

The system needs routine maintenance every 850 hours of operation – which equates to approximately every two months. Plant performance is monitored remotely at the supplier's office. If problems arise with the plant it may be possible to effect a remedy via the remote link or if not a maintenance engineer is sent to the site. If the hotel loses power from the national grid, the hotel's electricity requirements are fully met on site by the CHP plant along side a 600 kW generator.

Economic / Environmental benefits[1]

Economic

Capital Cost: €145,000
CHP Fuel Costs: €80,000 per year
CHP Maintenance Costs: €9,000 per year
Electricity Savings: €94,000 per year
Thermal Savings: €55,000 per year
Annual Savings: €60,000 per year
Payback Period: 2.5 years

Environment

Annual Energy Savings: 400,000 kW per year
Annual CO_2 Savings: 250 tonnes per year

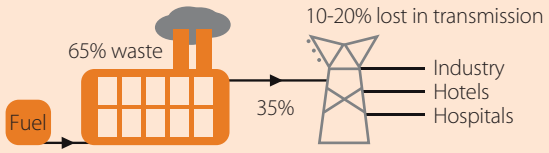
Key Project Developers/Suppliers

Consultants: L. Lynch and Co, and Temp Technology Ltd
Supplier: Temp Technology Ltd
Installer: L. Lynch/Temp Technology
Project Contact: Temp Technology
Tel: +353 61 413299

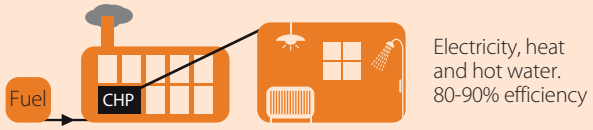
[1] Economic and environmental comparisons were made against a conventional system comprising natural gas boilers and electricity from the national grid.

Technology Principles

Traditional Electricity Generation Efficiency: <35%



Combined Heat and Power Efficiency: >80%



Technology Description

CHP, often referred to as cogeneration, is the combined production of heat and power in a single process. It takes advantage of the heat rejected in the thermo-dynamic conversion process from primary fuel to power. This heat is then supplied for useful purposes.

It therefore typically saves around 25% of the energy that would have been required to produce electricity in a conventional power station and heat in separate heat-only boilers.

The vast majority of CHP users in Ireland qualify as auto-producers i.e. they produce electricity for use on a single premises. A small number hold a licence to supply electricity. Therefore, for most CHP users, although the CHP unit is connected to and synchronised with the electricity system, payment is made for any additional electricity units imported, but no payment is given for any surplus units exported. Larger schemes are more likely to actively participate in the electricity market, where a spill payment is made for exported electricity.

The benefits of CHP when compared to importing electricity and using boilers to generate heat include:

- improved efficiency of overall primary energy use,
- energy and CO_2 emissions savings,
- independence and security of power supply.

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