



Electricity from waste heat cuts operating costs

For the first time, the Heatcatcher system for generating electricity from waste heat was integrated in a lime plant. The £1.3 million 'waste heat to power' system installed by Heatcatcher Ltd generates an estimated net power of around 3,000 MWh a year from the waste heat of the lime kiln via an ORC process (Organic Rankine Cycle). High efficiency condensers supplied by Güntner, a global leader in the manufacturing of heat exchangers, contribute to the reliable and economic operation of the plant.

The Heatcatcher System uses waste heat to vaporise the refrigerant which, in turn, drives a rotary generator. The circuit is driven by a pump that feeds the liquid refrigerant to an evaporator under increased pressure. This evaporator is located at the lime kiln's hot exhaust gas stream. It is used there to vaporate the refrigerant. The compressed hot gas is then used for generating electricity in a compact power module:

The gas is expanded through a small turbine and drives a coupled high-speed electrical generator via this turbine. The expanded gas is then turned back into a liquid at a low pressure stage as it passes through four air-cooled Güntner V-SHAPE Vario GVD condensers, and the cycle repeats itself.



Overview

Business line:	Energy & Process
Application:	Mining
Country/Region:	UK / Thrislington
Fluid:	R-245fa
Product:	Güntner air-cooled V-SHAPE Vario GVD condenser

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▲ Four Güntner air-cooled V-SHAPE Vario GVD condensers are part of the Heatcatcher ORC system generating electricity from waste heat for own requirements.

Economic Güntner V-SHAPE Vario

The generated electricity is converted via the variable frequency and voltage output of the generator to match the local grid, and this electrical output is fed back into the lime plant's power supply. The Heatcatcher system installed in Thrislington recovers 4 MWh of thermal power and converts it to 0.5 MW of cheap, environmentally friendly electrical power. This results in annual savings of about 3,000 MWh for the operator Steetley Dolomite Limited, which corresponds to the annual power needs of 150 households and reduces the total carbon dioxide (CO₂) emissions by 1,600 tonnes per year.

The air-cooled Güntner V-SHAPE Vario condensers, type GVD, were supplied ready for connection with fans already wired to control units ex works. The low refrigerant pressure drop and low power EC fans reduce the operating costs of the plant to a minimum, so maximising the return on investment (ROI). Güntner's tried and tested floating coil principle prevents refrigerant-carrying tubes from coming into contact with the casing; the tubes can thermally expand and contract without restriction during operation. This reduces the chance of leaks and increases the plant's operational reliability.

Longlasting partnership

Güntner has worked with Heatcatcher for four years and, in that time, the two companies developed a close working relationship. Justin Scofield, Managing Director of Güntner UK, said: „We offer an extensive range of solutions to the market and are a proven supplier of heat exchanger products to industry leading names in the energy and process cooling sector. We share many values with Heatcatcher, including a bone-deep commitment to the highest customer service and a passion to develop leading-edge equipment that meets the toughest environmental demands.“

Darren Bryant, CEO at Heatcatcher Ltd, is enthusiastic about the technology of producing electricity from waste heat: „We believe that this technology will be a step-change reduction in the energy intensive production costs of European Lime and Cement manufacturers.“ Michael Harman, plant manager at Thrislington lime plant, added: „The system was installed with very little disruption of our day-to-day output and is surprisingly autonomous.“