



Precedent-setting combination of Clean Cycle™ generator and Jenbacher gas engines reclaims waste heat for power

Risley landfill
Warrington, United Kingdom



GE's Clean Cycle™ power generator teams up with Jenbacher gas engines to create additional power

Biffa Waste Services Ltd. operates the Risley landfill in Warrington, United Kingdom. For more than 10 years, the company used two of GE's Jenbacher J320 gas engines to generate power from the landfill's methane gas. But the leftover heat from that process was being wasted – and with it, the opportunity to create another revenue stream.

By combining two Jenbacher gas engines with a Clean Cycle™ Organic Rankine Cycle solution in September 2011, the Risley landfill became one of the first landfills in the UK to produce electricity from engine exhaust heat.

"We have operated a fleet of Jenbacher gas engines for more than 10 years, and during that time they proved how reliable and efficient they were," reports Michael Lee, GTE Division Operations Manager for Biffa Waste Services Ltd. "Now we're taking advantage of the combined application of the gas engine technology with the Clean Cycle technology to successfully produce surplus power while reducing the environmental impact, and set a precedent for the U.K. in the process."

GE's combined application of the Jenbacher gas engines and the Clean Cycle waste heat-to-power generator allow the conversion of waste heat from the engine exhaust into 102 kW of average exportable power over the course of one year. Furthermore, the Jenbacher gas engines allow methane gas to be efficiently and effectively transformed into a usable energy format instead of merely flaring to the atmosphere, where its environmental impact is up to 20 times worse than carbon dioxide.



GE Energy Gas Engines

Customer advantages:

- Converts waste heat from engine exhaust into power
- Cleaner energy with no fuel required and producing no additional emissions
- Allows for sale of excess electricity to the local grid, creating revenue



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Key technical data:

Number and type of units	1 x Clean Cycle generator; 2 x Jenbacher J320 gas engines
Thermal input	980 kWth (33.4 MBtu/hr.)
Electrical output – Clean Cycle unit	102 kW net

Ecomagination qualified

Ecomagination is GE's corporate-wide initiative to use and develop new technologies that help customers meet pressing environmental challenges. The Clean Cycle system has received ecomagination qualification for its ability to provide customers with cost-saving and environmental benefits, such as the generation of about 1 million kW of electricity and the avoidance of 350 metric tons of CO₂ per year in combination with a Jenbacher gas engine. That equates to the annual electricity consumption of 240 European households and the annual CO₂ emissions of almost 200 cars on European roads. For more information on ecomagination, please visit our website at www.ecomagination.ge.com.

GE's Gas Engines division

GE Energy's Gas Engines division is a manufacturer of gas engines, generator sets, combined heat and power (CHP) modules, Organic Rankine Cycle (ORC) systems and auxiliaries. With a legacy of technological innovation across three product lines, including Jenbacher engines, Waukesha engines and Heat Recovery Solutions technology, GE's gas engines set the industry standard for flexible fuel capability, low emissions and efficiency. Engines can operate not only on natural gas, but on a broad range of alternative gases such as biogas, landfill gas, coal mine gas, flare gas and sewage gas featuring impressive fuel flexibility. Solutions include combined heat and power, gas compression, and waste heat-to-electricity generation in industries ranging from oil & gas and agriculture and are deployed in over 80 countries. With this ability to provide diverse power output, ranging from 0.12 – 9.5 MW, and eight products and solutions qualified through the GE ecomagination program, GE's Gas Engines business offers specialized local power solutions to deliver cleaner, more efficient, affordable energy around the world.

GE's Gas Engines business has its headquarters, main production facilities, and more than 1,400 of its 2,600 worldwide employees located in Jenbach, Austria. GE's Jenbacher gas engines also operate two regional gas engine assembly facilities in Hangzhou, China, and Veresegyház, Hungary. The Waukesha gas engines are located in Waukesha, Wisconsin, and the Heat Recovery Solutions facility is in Stuart, Florida.



GE imagination at work