

Landfill Powerprofile

Customer: Summerleaze Re-Generation Limited

Location: Biffa Poplars Landfill Site, Staffordshire

Customer requirement:

Continuous power using landfill gas

Equipment: 3 x G3516LE gas generator packages

Services: Engineering, design and planning, equipment testing, delivery, set-up and installation, full operation and maintenance contract including 24/7 remote monitoring and ongoing product support

Power Need

Although a power generation plant existed on this former open cast mine, surplus gas dictated a need for further units. Landfill gas is controlled by the installation of a number of extraction wells installed in the body of the waste. Positive suction is applied to these boreholes to extract gas from within the waste. Gas from the site is used to supply electricity to the National Grid that would otherwise be wasted through flaring.

In addition to power—in a partial CHP application—heat was required to warm the leachate lagoon in order to accelerate the biological activity which hastens the breakdown of the leachate. The site is operated by Biffa, which is part of Severn Trent Water, and Summerleaze is subcontracted to manage the gas.

Solutions

Following a proposal resulting from a careful analysis of the site and engineering requirements, Finning were awarded the contract.

Finning supplied 3 x Cat G3516LEs which now produce 'green' electricity under the Government's Renewable Obligation Certificate scheme (ROCs).



Each engine is capable of burning varying quantities of gas in order to produce 1.1MW of power every hour.

In addition to generating electricity, hot water from the engines' cooling jacket is deployed to heat the leachate lagoon.

One particular concern with this site is the silicon in the gas—this is a result of the deterioration of domestic products including plastic



Results

Over two years of operation, high levels of reliability have been experienced. The presence of silicon in the gas creates ash build up within the combustion chamber necessitating a carefully planned routine servicing requirement. To keep this under cost-effective control, there is weekly monitoring which involves analysing engine oil at Finning's laboratory, both for contaminants and wear materials from the engine.

To provide a resolution to this situation, there are plans to install a siloxane scrubbing plant, which will remove the silicon from the gas before it enters the engines: The level of contaminant will reduce from 300 down to 3 PPM.

The generation resource will be extended to install further equipment based on the new Cat G3520 engine. This state-of-the art 20 cylinder crossflow engine provides even higher levels of efficiency than its predecessors, with electrical conversion rates exceeding 40%.

Summerleaze's Mike Williams says: 'Cat power generation backed by Finning is delivering impressive reliability. This is particularly important to us, as the Poplars site will be producing gas in the long term. We anticipate that with maintenance and scheduled rebuilds, these engines will last for as long as gas is being produced.'

