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Landfill site cuts pump power by a third with variable speed drives

ABB drives cut power use of gas pumps, allowing more energy to be sold into the grid.

A landfill site has saved a third of the power used by motors to pump gas, following the installation of two ABB variable-speed drives (VSDs).

Methane gas extracted from decaying waste at the site is used to generate electricity. The two 45 kW VSDs efficiently control the speed of the motors running the gas compressor pumps, which were previously operated direct-on-line. Maintaining the correct gas pressure from the pumps allows more efficient operation. This means an extra 199,368 kWh per year can now be exported back on to the grid, increasing revenue by £16,946.

The solution uses two ABB general purpose drives to provide constant gas pressure to the generators. The VSDs use pressure transducers to feed back the gas pressure to the drives and allows them to control the speed of the motors to maintain the pressure at the correct level.

Patersons Quarries' landfill site at Mount Vernon near Glasgow covers 91 hectares divided into four zones, each operating independently to prevent the migration of gas and other materials. The site also includes a fenced gas management compound. This brings in gas from the zoned sections of the landfill site and burns it to produce heat to convert into electricity.

The site produces 40,000 MW of green electricity a year, enough to power up to 4,000 homes. This is sold by Patersons to Scottish Power Distribution, producing a significant income stream from the site.

The gas management compound has four, 45 kW motors which are used to boost gas pressure to 100 mbar to ensure correct combustion in the site's five generators. Two of these motors are used at any one time to provide gas for all of the generators.

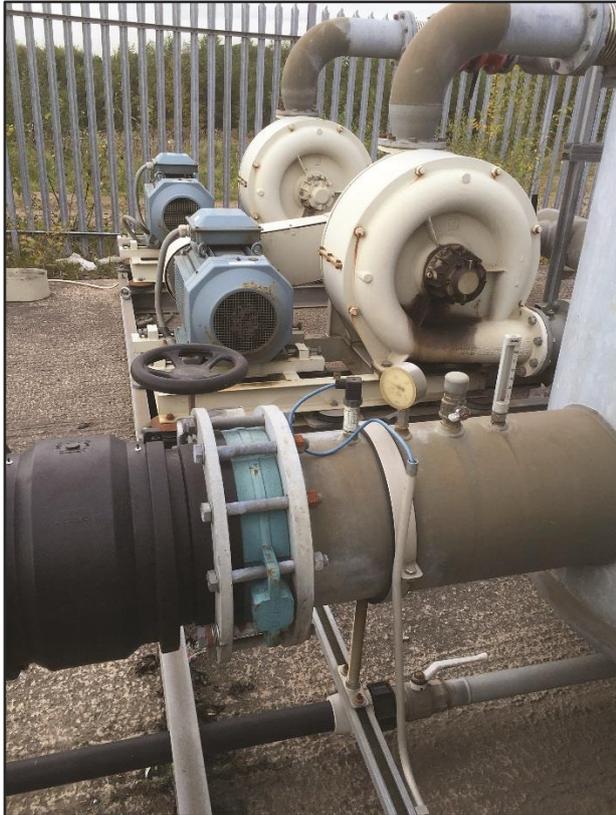
"The main problem was that the motors were running at 100 percent speed all the time, whether they needed to or not," says Alan Hoggins, site manager at Mount Vernon. "Because the motors are run from the electricity we generate on site, this was obviously wasteful of energy that we could otherwise sell." Patterson was interested in gaining a better control of this process to ensure it could always maintain the correct gas pressure. The company approached EDC, the ABB authorised value provider for Scotland, which it had worked with previously on a project at one of its silica sand quarries. This project had used a VSD to control the pumping of water.

EDC performed an energy assessment on the booster pumps. This logging revealed that using VSDs to run the compressor pump motors could save a third of the energy used.

Another challenge was that the existing star/delta enclosures were too small to take the VSDs. To solve this, EDC designed custom enclosures to house the drives and other components. These were sited next to the existing enclosures, with interconnections between them.

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Caption: Patersons Quarrie's Mount Vernon landfill site has cut power use of its gas pumps by a third, following the installation of ABB drives.

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