

Reduced Emissions for Landfill Gas Installations



1 A landfill gas installation for the production of biogas.

The use of landfill gas as a source of renewable energy is increasing. For environmental and safety reasons, the owners of the waste storage sites have to strictly monitor and control the construction, operations, and emissions generated. Sulzer offers solutions to control these emissions within the limits given by the government.

Landfill gas is similar to natural gas, but it is created by the anaerobic digestion of waste or biomass through microorganisms. Source material can be municipal garbage, agricultural waste, manure, plant material, food waste, or wastewater. Landfill gas is a complex mix of different gases, consisting of 40–60% methane (CH_4). The remainder is mostly carbon dioxide (CO_2). The landfill gas can be used directly on site by a boiler or any type of combustion system that provides heat.

Electricity is generated on site using gas engines, microturbines, steam turbines, or fuel cells. For safety and environmental reasons, the government and environmental agencies mandate strict emissions regulations during the production of landfill gas.

Suitable for the landfill or wastewater industry

Gas engines driven by gases from the landfill or wastewater industries operate under harsh conditions. The

siloxane impurities in the waste, sourcing, e.g., from deodorants or shampoos, are one of the many challenges in working with landfill gas. Siloxane reformulates during combustion in the engine and forms silica particulates, which coat and destroy components and sensors. Technical experts from Sulzer's service center in New Orleans, LA, USA, together with customers, developed a solution to control and reduce the emissions for landfill gas engines. Using sophisticated generator controls (Altronic-EPC-250 and Altronic-EPC-100 E) and platinum oxidation catalysts from third parties, they managed to control and reduce emissions as well as increase the operation efficiency (Figs. 2 and 3).

Air-fuel ratio control decreases emissions

The company Granger, which is based in Lansing, MI, USA, has been involved in developing renewable energy projects for over 30 years. Granger was seeking a solution to keep the gas engine running automatically and failure free within the emissions limits. An additional requirement Granger had was remote access to the control. This allows monitoring and adjustment of the power engine from anywhere in the world via an Internet connection.

The EPC-250 control, programmed and installed by Sulzer, can manage complex air-fuel ratio curves and can deliver the landfill gas to the gas engine according to given limits. The improved fuel efficiency that follows leads to a higher electricity yield of the generator. The improvement results in a payback period of just 21 months for the investment.

"The air-fuel ratio control developed by Sulzer helped us to tune for emissions compliance. We undergo annual emissions testing by the United States Environmental Protection Agency (EPA). During the test an EPA member stated that they never had seen such stable running conditions and emissions data on a generator before. The greatest benefit of the EPC-250 is fuel efficiency. For 90 days, we logged data from two engines. One was equipped with an EPC-250 control, and the other was not. During this period, we kept both generators running at the same load of 750 kW. The EPC-250-controlled generator performed better with less downtime, and it showed a fuel efficiency improvement of 2.68% over the non-controlled engine. That leads to 2.68% profit increase for our business." **Jeff Summers, Operations Technician at Granger**

Tailored to individual requirements

The installations for landfill gas or wastewater gas differ. The governmental regulations vary from country to country as well. That's why the Sulzer air-fuel ratio controls are individually adaptable. The technicians from Sulzer work extensively with customers around the globe to develop solutions tailored to individual, local requirements.

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2 Instrumentation at the generator for the new control.



3 Programming the EPC-250 air-fuel ratio control.